PEDIATRIC CLINICS OF NORTH AMERICA

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Alex J. Steigman, M.D.
Keith Hammond, M.D.
Consulting Editors

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Forthcoming Symposia:

MAY, 1961 **The Newborn**

R. James McKay, Jr., M.D., Consulting Editor

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NOVEMBER, 1961 **Antibiotic Therapy**

Benjamin M. Kagan, M.D., Consulting Editor

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SYMPOSIUM ON OFFICE PRACTICE AND PROCEDURES

FOREWORD

ALEX J. STEIGMAN, M.D.

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Consulting Editors

An issue of the *Pediatric Clinics of North America* dealing with new advances involves as authors those who are in the forefront of these advances. When an issue deals with uncommon problems, the subspecialists who concentrate on such problems logically become the authors.

How, then, to deal with an issue devoted to everyday problems, for which important details are often not written in standard texts or reviews? Authors could be recruited from a potentially large pool of physicians in active practice, each of whom has perhaps developed a set pattern through experience.

The Editor of the *Clinics* determined that there was interest and need for a compilation of this sort. The Senior Consulting Editor undertook the task with the following resources: (1) a staff group engaged in active general pediatric practice who could convey a picture of how everyday problems are dealt with in one representative metropolitan area; (2) an enumeration kept over the past 10 years of questions most frequently raised at postgraduate meetings and seminars; and (3) a consulting co-editor freshly completing a pediatric residency after 15 years of busy general practice in a smaller community.

This issue represents clinics in the sense of "how I do it." As such, its content has the value derived from experience and the limitations imposed by understandable personal preferences. It is not easy to keep routines for ordinary problems under constant re-evaluation. It is hoped that this will be one useful by-product of this issue for the physician dealing with the harassed parent and the well or the sick child.

ANTICIPATORY GUIDANCE

R. LEE WALTON, M.D.

I hold that it is an excellent thing for a physician to practice forecasting. For if he discover and declare unaided by the side of his patients the present, the past and the future, and fill in the gaps in the account given by the sick, he will be the more believed to understand the cases, so that men will confidently entrust themselves to him for treatment. Furthermore, he will carry out the treatment best if he know beforehand from the present symptoms what will take place later. . . —Hippocrates, *Prognostic*; from George Schwartz and Philip W. Bishop: *Moments of Discovery*. Volume I, "The Origin of Science," 1958.

But my purpose is here to doo theym good that haue moste nede, that is to saye, children. . . —Thomas Phaire: *The Boke of Chyldren*, c. 1545. Edinburgh and London, E. & S. Livingstone, Ltd., 1957, p. 13.

Anticipatory guidance is the physician's interpretation to parents of the normal growth and development that may be expected of their children. Its purpose is to bring about understanding, insight and healthy mental attitudes in parents, and in this way assist them in fostering optimal physical and mental growth and development of their children. Successful anticipatory guidance promotes greater comfort and peace of mind for parents and healthier development for their children. The practice of anticipatory guidance should be based upon the following principles: (1) Acceptable limits of growth and development cover a wide range of normal activity and behavior. (2) An orderly or reasonable progression of infants and children through the usual stages of growth and development can be more meaningful than the determination of an absolute level of development or comparison with a so-called norm. (3) Parents can gain great enjoyment by watching their children develop in their own ways rather than by trying to direct them towards preconceived goals. (4) A child has rights and privileges and is trying to achieve his own independence while maintaining the security of family life. (5) Above all, the physician should not cause anxiety through unwise counseling.

PRENATAL CONSIDERATIONS

Prenatal consultations between expectant parents and infants' physicians are not as widely utilized as they might be. Nevertheless such

consultations are golden opportunities for physicians to evaluate parental capabilities and to reassure parents that the care of their newborn infants will be competently supervised. Questions about general baby care, Rh incompatibility, breast feeding, rooming-in, superstitions and other problems can be answered at this time. If there are already children in the family, the physician should point out the usual effects of a new baby on older siblings. Such problems may involve behavior disturbance or regression. These are best met with matter-of-fact acceptance, patience, understanding and sometimes extra attention.

NEONATAL CONSIDERATIONS

Before the newborn infant leaves the hospital nursery the physician will have a chance to explain to the mother some of the usual behavior expected of new babies. Feeding schedules should be flexible enough to allow an infant to feed pretty much according to his own needs and appetites. There certainly is a wide range of normal feeding habits in both frequency and volume of feedings. Some regurgitation can be anticipated for most infants. Many of the feeding problems of older infants and children might be prevented by pertinent interpretations at this time. Parents should be helped to feel comfortable about their children's natural eating habits and cautioned against forcing preconceived dietary regimens on their children.

Since there is often a great deal of concern about bowel habits, it should be explained that some infants have frequent bowel movements, others infrequent, some soft, others hard; some with little straining, others with greater straining.

The usefulness of crying as normal exercise for small infants should be pointed out. It should also be explained that newborn infants should be protected from persons with colds or other infections. Comments about thumb-sucking, shyness and teething can be made at the appropriate time.

MOTOR DEVELOPMENT

The wide range of normality is evident in the area of motor development. It is not necessary to perform a detailed developmental examination on every infant. It is generally sufficient to indicate the normal range to parents. This subject is covered elsewhere (see p. 19).

FOOD, HEIGHT, WEIGHT

The physician should continue the good feeding advice offered in the neonatal period by continuing to promote eating habits that are both psychologically and nutritionally advantageous. From the very first it should be emphasized that appetites vary not only between infants, but also in the same infant from time to time. Balanced diets are important, but need not necessarily be achieved in a single meal. Force feeding

will result only in obstinate refusal to eat or may sometimes lead to overeating.

It should be anticipated that the tremendous growth spurts of the first six to nine months of life will taper off and continue at a much more leisurely pace until the growth spurt of adolescence. Iowa or Harvard growth charts are valuable adjuncts here in pointing out the normal variations in height and weight to be expected.

TOILET TRAINING

Few infants develop sufficient sphincter control and emotional maturity to be trainable before a year of age. This is so generally true that it is unprofitable, if not psychologically undesirable, to make any training efforts before this time. Many infants are ready by 18 to 24 months to begin imitating adult toilet behavior. A few need another year or so to gain confidence in their own sphincter control, or to feel enough freedom of activity, to know that the choice of using the toilet like grownups is really independently achieved. Coercion, forcing and bribing will put off eventual training and might even form the basis for problems of enuresis or chronic constipation of older childhood.

ACCIDENT PREVENTION

The physician must begin early to advise parents how they may baby-proof their homes, since accidents are the commonest cause of childhood death after the age of one year. There is generally no problem until the infant begins to move around the house on his own. Certainly at that time the home should be safety-checked for all physical hazards, and all medications and poisons should be put well beyond the reach of small hands. Check lists are available for parents' use in baby-proofing their homes.

HOSPITALIZATION

Much can be done to prepare children for what is to occur during hospitalization. This may not make the experience less disagreeable for the youngster, but it should remove the surprises. Parents, too, need to understand that their children require a great deal of support through all this. Disturbed behavior that follows hospitalization will most readily resolve itself if the behavior is accepted more or less as matter of fact and the child is allowed to ventilate or act out his feelings. This demands more time and attention from parents, especially when the child regresses to babyish ways.

ADOLESCENCE

The reader is referred to the excellent writings which have appeared in recent years on adolescence. Application of the principles advocated by

these authors should be helpful to the physician who attempts to deal with or prevent delinquency, births out of wedlock and other less serious problems of teenagers. Physicians should be quick to realize that parents need interpretations of their teenagers' behavior. On the other hand, adolescent children are striving for acceptance, prestige and identities all their own. This means that physicians need to work more directly with children and less through their parents. Specific problems relating to growth, gynecomastia (see p. 339), undescended testes, sex questions and school attendance should be anticipated and interpreted.

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Some of the following references are suitable for use in the instruction of parents.

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BREAST FEEDING

CATHRYN C. HANDELMAN, M.D.

In our modern western civilization the expectant mother faces many problems for which she seeks counsel from the physician. She may consider decisions about breast feeding as a problem. The physician, at any rate, should mention the subject even if the expectant mother fails to do so.

During the woman's pregnancy the physician should ask her, "How do you plan to feed your baby? You may not wish to give an answer now, but you should be thinking about it." You open the door for deliberations and present an opportunity for the patient to make future plans.

GENERAL CONSIDERATIONS

Several factors must be considered in discussing the feasibility of breast feeding. Certainly no attempt at breast feeding should be made if the mother is employed outside the home. Both parents should be in agreement before a decision is made. Another area to be investigated concerns the amount of work the mother must do after she has been dismissed from the hospital. Will she have a relative staying with her for a time? Will she have hired help? On the surface these questions may seem to be superfluous, but they are all-important. The parents' mode of living bears investigation. Do they live in a suburban area? Does driving consume much of the woman's time? Are their social activities great *and* a necessary part of the husband's job?

After disposing of general considerations we must view the mother critically. Physical abnormalities such as inverted nipples may make nursing an impossibility. Her health is also an important consideration. Nursing should not be permitted if she has any chronic or debilitating disease. Even with optimal health the mother undergoes considerable physical strain as evidenced by weight loss while nursing. Poor nutritional status of the mother is a contraindication to nursing. If a malnourished prospective mother early in her pregnancy expresses a great desire to nurse her baby, you may be able to help her attain a better

nutritional status in preparation. The mother's mental attitude and desires are important.

Speaking as a physician and a mother, it is my belief that breast feeding is best if it can be accomplished. It is desirable *if* it can be accomplished without supplemental bottle feeding except perhaps as a substitute once a day, allowing her extra time outside the home if necessary. Once we establish the parents' desire to breast-feed the baby, we answer any questions which may bother them and give specific advice and instructions. This is best accomplished with both parents present.

GENERAL INSTRUCTIONS FOR PRENATAL CARE

Perhaps the best care of the breast and nipples is daily bathing. Vigorous washing of the nipples with a wash cloth, soap and water should suffice. In the latter months of pregnancy, in addition to brisk washing, the nipples should be rubbed several times a day with a soft towel. Some authors advise rubbing the nipples daily with cocoa butter, but it is questionable whether this does any good. It may even soften the nipples and predispose to cracking. Good, uplift brassières should be worn day and night. During the last six weeks of pregnancy the mother may start expressing colostrum manually once a day. Well constructed nursing brassières with an opening in front should be purchased and worn day and night during the nursing phase.

The mother should strive for optimal health during pregnancy. A well balanced diet, with added vitamins if necessary, should be outlined for her. Plenty of rest, good elimination and a relaxed attitude will help. The mother must exercise daily during pregnancy and after parturition. Walking is excellent. She needs not only the psychological preparation for nursing, but also the physical.

The woman and her husband or both may be worried about her figure if she breast-feeds the baby. With modern self-care, exercise and nutritious diet there need be no loss of figure. If anything, the woman must be told that she may become too thin. Exercises later, after cessation of nursing, may be advisable.

Some women are disturbed when they are told by friends and relatives that they must give up smoking and alcoholic beverages. They may be reassured that these *in moderation* are not contraindicated. An occasional cocktail and certainly mild smoking, when a woman has been accustomed to these, may help her to maintain a feeling of well-being.

Plans for the upkeep of the house will have to be made. This is important because too heavy a work schedule for the mother can ruin nursing plans. Both parents must realize that their schedule must become flexible enough to adjust around the baby's needs until he can become more conforming. The husband needs to be understanding when a previously orderly house now becomes somewhat disorderly, cluttered and undusted. For the immediate postpartum period a relative or hired help is planned. If this is not feasible, the husband's vacation may have to be planned for this time. Diaper service proves to be al-

most as cheap as laundering at home, all things considered. The mother is often under great emotional stress for the first few postpartum weeks. Any situation which can be made to seem lighter or any household chores which can be made less burdensome to her will pay dividends in a happier home environment for all persons, including the new baby.

ADVANTAGES OF BREAST FEEDING

The mother generally asks whether there are any advantages to breast feeding. Many areas in nature still remain a mystery. We know of some advantages in breast feeding, and we feel that there must be others. The mother's own milk is the most natural food for her baby, specific for the human infant. The distribution of the essential nutrients differs from that of cow's milk. One author proposes that the excessive calcium content of cow's milk with vitamin administration may lead to hypermineralization. Nelson has an excellent table showing the comparative contents of human and cow's milk.[4]

Breast milk is always ready for use, day or night, is at the proper temperature and free from bacterial contamination. This is an advantage to the mother, for she does not have to make formula, sterilize and heat to serve. It is to baby's advantage also. She cannot turn the feeding over to another member of the family or prop the feeding apparatus. She must hold her baby. These things are psychologically good for both mother and child. The act of feeding her baby may breed a closeness which might otherwise be lacking. Also, the act of feeding the baby may be a welcome rest period for the mother.

Breast-fed infants may have fewer gastrointestinal upsets. This could be due to the fact that the stools of breast-fed infants contain predominantly lactobacilli as contrasted with those of artificially fed infants, which contain predominantly the coliform group of bacteria.

As for immunity, it has been repeatedly shown that measles is less prevalent in breast-fed infants than in artificially fed infants. Some claim that illness in general, especially upper respiratory tract diseases, is less prevalent in breast-fed infants. Others claim that there has been no substantiating proof of this. If there is definite immunity to one disease, it would seem highly possible that there might be immunity to other diseases also. Atopic eczema and gastrointestinal allergies are less common in breast-fed infants.

Once feeding is established there is the allied advantage of never having to bother with changes of formula. This is in contrast to the many bottle-fed infants who cry day and night while frantic and innumerable formula changes are tried. Among the lower socio-economic group it is an advantage because of (1) money saving (perhaps at the mother's expense), (2) lack of contamination.

INSTRUCTIONS FOR BREAST FEEDING

The mother should know that the first few (two to four) days the breasts secrete a substance known as colostrum. This is high in protein

and low in sugar and fat content. Therefore the infant will lose weight at first. Actually it takes around three or four weeks for the milk to attain the final optimum consistency of breast milk. On this account there may be little gain in weight during this period, but this is no cause for alarm if the infant seems satisfied and happy. Twelve hours after birth the infant may be placed at the breast. The hospital nursery must be instructed not to give the infant any supplemental feeding except glucose water. While in the hospital the mother will have to feed the infant on the hospital's schedule unless there is "rooming-in."

Upon arrival home she should place him on demand feedings. At first the infant's stomach empties from one to four hours after feedings, so that there may be a wide variation in feeding times. These should be gradually lengthened and the feeding times adjusted so that eventually they do not conflict with the family schedule. During the first few weeks this conflict is unavoidable, and the parents must readjust their schedule temporarily. At the end of a week there should be a fairly adequate milk supply, and a fully adequate one at three weeks. If the infant is crying constantly, the milk supply may not be sufficient. After the first few weeks an outlined schedule may prove valuable to most mothers, with the understanding that this is not a rigid schedule and can vary with the child's needs. A schedule at which to aim helps the infant to adjust.

TECHNIQUE OF FEEDING

The infant is first made comfortable. The mother should wipe her nipples with sterile water or physiologic saline solution (at home, tap water is sufficiently clean). To feed the infant she should lie in bed on her side with the baby on one arm. The infant's cheek is placed against her breasts, and the nipple is held between the index and third fingers. The "rooting reflex" will enable the infant to grasp the nipple. The infant's lips and jaws should come up on the areolar portion of the breast with the nipple well back in the mouth. He usually obtains an adequate amount in 10 to 20 minutes, but may nurse up to 30 minutes. The infant should empty one breast completely at a feeding. The alternate breast is used for the next feeding. If the breast is not completely emptied, the excess should be manually expressed. The nipples should be wiped off and dried after feedings. If the infant empties both breasts at one feeding at first, he should probably eat more often until the milk supply is established. This is better than giving a supplemental bottle. When the milk supply is established, the length of time between feedings is increased. If both breasts have been nursed at one time, the infant should start with the breast last nursed. The infant may be weighed weekly, and if he gains 4 to 8 ounces, his milk supply is adequate.

It is essential that the nursing mother have as much rest as possible. One way to add to the rest and take the mother off her feet, especially during the first two months, is to instruct her to lie down to nurse the infant. It is best if this position can be continued.

MANUAL EXPRESSION

The mother grasps the breast at the areolar margin between the thumb and forefinger. The breast is compressed backwards and downwards, bringing the fingers together. Manual expression is preferred to mechanical means. It is used (1) six weeks prepartum to express colostrum and better prepare ducts, (2) to empty incompletely emptied breasts after feeding, (3) to relieve engorgement.

COMPLICATIONS

Complications to nursing may be maternal or may be due to some abnormality in the infant, generally the former. Cracked nipples are not a contraindication to breast feeding, but nursing should be accomplished through a shield until they are healed. A healing ointment such as lanolin or A&D ointment may be used. Some manual emptying before placing the infant at the breast will facilitate feeding if the breasts are engorged. If engorgement is not relieved as soon as it appears, distention and back pressure suppress the milk secretion and can result in a decreased milk supply. Hot or cold compresses may relieve some of the pain. Caked breasts are relieved by manual expression or gentle massage. This condition is due to ductal obstruction to the flow of milk (one or more ducts).

Mastitis is a definite contraindication to nursing. The breast is enlarged, hot and tender. There are fever, chills and malaise. Cessation of nursing, antibiotics and warm compresses are indicated. If the mother should desire to continue nursing, milk may be expressed routinely by breast pump and nursing resumed when the infection is under control. Usually, however, nursing is permanently discontinued.

STOOLS OF BREAST-FED INFANTS

The mother must be told about the stools of the breast-fed infant. The first three or four days the stools will be the greenish-black color of meconium, and there may be one after each feeding. The stools then become an orange color, soft, mushy and smooth, and have an odor that is somewhat acid and not unpleasant. The number of stools varies with the individual infant from one after each feeding to one daily. Occasionally an infant may have a stool only every other day after three or four months. There is no cause for alarm so long as the infant has normal-appearing stools and is happy.

Prepare the mother for possible food allergies transmitted to the child. Spicy foods and condiments in general should be omitted from the mother's diet. If she notices that the baby is uncomfortable or has an increase or change in nature of stools or has gaseous distention, she should note what she has eaten. After consultation with her physician she might possibly be asked to avoid a certain food. The mother's bowels should be regulated by diet rather than by use of laxatives. Laxatives may affect the infant's stools.

DISADVANTAGES OF BREAST FEEDING

Early, cracked nipples, engorgement, mastitis and caked breasts may be painful. These have been discussed. Nursing is a definite disadvantage and should be terminated if there is physical and emotional strain on the mother. It should be discontinued if there is not enough breast milk and it becomes necessary to resort to a supplementary formula. Mixed feeding is more burdensome than resorting to one or the other.

SUMMARY

Any physician who has observed breast- and bottle-fed infants must feel that breast feeding is best for the infant. As a physician and a mother I am strongly in favor of breast feeding. In order to accomplish it successfully the mother may need to be prepared for it physically and psychologically during pregnancy, by either her obstetrician or her practitioner. The physician must review her responsibilities with her and attempt to determine whether she will be capable of feeding her baby at the breast. A placid, relaxed mother is better suited for nursing than a highly nervous, overscrupulous person. Cooperation of the hospital nurse and the husband and the help of the physician are needed to establish adequate milk flow and maintain it.

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OFFICE MEASUREMENT OF PHYSICAL GROWTH

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The pediatrician has neither the time nor the necessity to run a "growth study" among his patients. But since many of his problems are allied to an assessment of growth and maturity, he can with profit measure his patients and then use the data obtained. There are three important questions: What shall he measure? How shall he do it? What information will the data give him? It is the purpose of this paper to answer these questions.

MEASUREMENTS OF PHYSICAL GROWTH

WEIGHT. Surely the most popular of all measurements made on children, weight has possibly been misinterpreted and given a more exalted status than any other. It is a highly unstable measure and is influenced by so many factors that, although it is useful, proportion must be kept in using it.

STATURE. Stature is the stand-by and most stable of measures. When it is combined with weight, a good idea of *size* is obtained.

HEAD CIRCUMFERENCE. Many pediatric conditions make this measure useful, especially in the first three years of life.

SKELETAL MATURATION STATUS. Assessment of this will be most useful in problems of growth. It should not be thought of as a routine procedure, but it is a good, reliable, over-all indicator of maturity.

PUBERTY STATUS. A reasonably objective measure of pubescence is essential when problems of growth occur in this age span, and as a maturity indicator.

There is another answer to the question, "What shall he measure?" This is, the *speed* of growth. Growth moves at various speeds, and it is usually more useful to know how fast or slow a child grows than to know how *much* he has grown at such an age. A combination of the two is ideal. Does this mean that the pediatrician must embark on

longitudinal, or follow-up, growth studies? It does; but then of course he is doing them all the time—on his individual patients.

This point is emphasized, for in measuring *gains* of growth, these measures are clearly going to be smaller in amount than total size measures. ("He is 48.5 inches tall, and gained 1.7 inches in one year.") This means that the actual measurements must be made *accurately*.

Techniques

WEIGHT. There are no two ways about it: weight must be obtained and recorded as *nude weight*. There are any number of expert studies which have got into trouble by not carrying this out. Clothing varies greatly from child to child, from season to season, from boot to shoe. So the baby or child is weighed nude; weighed clothed with clothing weighed and subtracted later; weighed in standard known weight clothing (a light robe; gym trunks); or in minimal underclothes, the weight of which is *reasonably* known by experience and some test weighings. The last will be the method used by most. At all events the weight recorded should be nude weight. (There is a trick useful for a very frightened and upset child: He may prefer to be weighed, as a last resort, in his mother's arms when both are weighed together. Her clothed-weight is then subtracted.)

There are many excellent scales available. They should be rugged and be checked periodically. (A recent survey showed a surprising and alarming variation in scales' accuracy used in hospitals and physicians' offices. The worst was a beam-balance in constant use recording an error of +7 pounds!)

Two scales are necessary: baby scales and scales for older children—ideally a platform beam-balance. Recording of weight to the nearest ounce in babies and the nearest ¼ pound in older children is necessary.

STATURE. Recumbent length is not the same as standing height and is obviously always greater. It can differ by as much as 10 to 30 mm. Recumbent length is used for infants and up to two years ideally. It is difficult to get a two-year-old to stand correctly sometimes, and the "change-over point" to standing height is not a rigid one.

Recumbent Length. A measuring table or board (portable) is needed. Figure 1 shows one which is simple and cheap. A wooden rule is screwed down one side. A rigid head-board is affixed at right angles (angle brackets are useful), and a movable foot-board is two wooden rectangles fixed together at right angles. A hand holder completes it. As long as one side of the foot-board is kept firmly running alongside the ruler edge, and the base is firmly on the table, then it will be constantly parallel with and perpendicular to the head-board. The scale is read where the foot surface meets the ruler. (A little marker may be attached.)

Two people are required for the measurement. The baby lies on his back on the long axis of the measuring board (or measuring table). His mother, or helper, holds the crown of the head up against the head-board. She is helped to position the head so that the external auditory meatus and lower margin of the eye orbit are perpendicular.

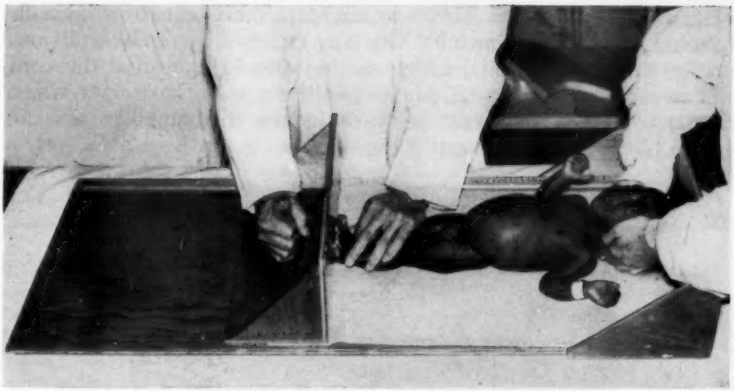

Fig. 1. Technique of measuring recumbent length.

The measurer now grips both ankles with one hand and places the heels firmly against the foot-board, which is manipulated with the other hand. The knees will now be flexed often in protest, and they may be firmly pressed down on the table with the lateral edge of the hand. It is usual at this point for the head-holder to remark that the head is no longer against the head-board. This is very good, for the head is now gently but firmly brought back to the head-board, the foot-holder not giving way too much. This means that the baby is being very gently stretched, which is exactly what is required to overcome his understandable "contraction" of his frame.

Standing Height. There are gymnasiums all over the world where height is measured by using a wobbly wooden arm which projects from a central pole. Unless this is ruggedly made by a skilled engineer in metal, the arm soon gets pulled on, and so forth, and quickly becomes seriously inaccurate. (Again, a recent survey showed up large errors.)

The simplest, cheapest and most practical apparatus is, in principle, the measuring board just described, stuck against a wall. Figure 2 shows this. The principle is exactly the same; a simple counterweight is a useful additional luxury.

The position of the child is most important. He is asked or helped to stand erect, with heels, buttocks and shoulders against the wallboard. Heels are together, and the feet make an angle of 45 degrees with each other for a comfortable stance.

The axis of vision must be horizontal and the child asked to look straight ahead. (The auditory meatus and eye orbit line as in recumbent length are the same, only now horizontal.) At the side the auditory meatus, acromium process, hip trochanter and lateral malleolus of the fibula should all be in one perpendicular line.

The child now must "make himself as tall as he can, keeping his heels on the ground." (While he is doing this, reach down and make sure that they are.) Some children will need gentle stretching by raising the head on the shoulders. The head-block is now brought down onto the crown of the head and the stature recorded.

HEAD CIRCUMFERENCE. The measuring tape must be *narrow*. (Ideally it should be of flexible metal.) The tape crosses the frontal bone area superior to the supraorbital ridges, passing round the head at the same level on each side, and posteriorly lying at the level of the occiput, where it is moved to read the maximum circumference. The tape has sufficient tension to crush the hair against the skull.

Fig. 2. Technique of measuring standing height.

SKELETAL MATURATION STATUS. In the instances wherein an assessment of maturity is needed, a dorsipalmar x-ray film can be taken, or asked for, and the radiograph compared to the Greulich and Pyle Atlas (1959) for a measure of bone age. In the bibliography will be found references to this factor.

To oversimplify, for example, a child retarded in bone age ("late maturer"), although small before puberty, may well continue to grow a longer time than average, having reached puberty "late," and thus finish up as a reasonably tall adult. When the epiphyses are closed, no more growth can take place. To know, therefore, where a child is on his "skeletal maturity curve" is often helpful in problem cases.

PUBERTY STATUS. Table 1 is a simple way to rate this factor and shows the progression. In problems of size (big as well as small), to know where a child is in relation to his puberty growth spurt is most important. It should be noted here that the menarche almost invariably occurs *after* the peak of the puberty growth spurt has been reached. In other words, it does *not* "usher in puberty" in the girl, nor is it an early sign.

TABLE 1. *Stages Indicating Puberty Status*

	BOYS—GENITALS
Stage 1	Prepuberal: testes and penis size similar to that in early childhood
Stage 2	Testes enlarging; scrotal skin reddens and coarsens
Stage 3	Continuing stage 2; penis lengthening
Stage 4	Penis enlarging in general size; scrotal skin pigmented
Stage 5	Adult genitals
	GIRLS—BREASTS
Stage 1	Prepuberal: childhood appearance; flat
Stage 2	Small raised breast bud
Stage 3	General enlargement and raising of breast and areola
Stage 4	Areola and papilla forming *separate* contour to breast
Stage 5	Adult breast; areola now in same contour as breast
	BOYS AND GIRLS—PUBIC HAIR
Stage 1	Prepuberal: no true pubic hair
Stage 2	Sparse growth of downy hair mainly at base of penis or at sides of labia
Stage 3	Pigmentation, coarsening and curling with increase in amount of hair
Stage 4	Adult hair, but limited in area and no spread to thighs
Stage 5	Adult hair with horizontal upper border and spread to thighs
Stage 6	Spread above horizontal line

Thus a child will have 2 ratings. Usually the stage of pubic hair is placed second. For example: Boy aged 12 years 3 months; puberty status 2:2.

Interpretation of the Data

This is not the place to discuss growth charts, grids and the like. The pediatrician either will have chosen, or will choose, the recording method he wishes to use. The following points are made.

1. Recording a child's position on a visual curve or grid has advantages in a busy office.

2. The data used to standardize whatever tables or curves are used should be known. They should represent averages of populations of children reasonably similar to the individual patient, and be reasonably modern. (Children are maturing earlier every year.)

3. It cannot be too strongly stressed that the average or mean is *not* synonymous with "normal." Since healthy children vary tremendously in size, the *average range* of measurement is what should be used. A child's place in this range should be noted and recorded. It matters little whether he is average—it does matter if he was regularly very heavy and then suddenly fell below average for his age. Generally accepted ranges of average are between the fifth and ninety-fifth percentiles of measurement. (The fifth percentile, for example, is the point at which

5 per cent of most children will be smaller, and 95 per cent bigger—say in height. Between the fifth and ninety-fifth percentiles you would expect to find 90 per cent of all children.) Plus or minus 2 standard deviations of the mean may be used, giving very nearly the same ranges.

4. *Gains* (or increments). Earlier we mentioned the speed of growth. If two measurements known on a child are separated by a known time interval, then the difference between the two measures is the gain or loss (positive or negative increment) over that period of time. The pediatrician collects these data all the time. It is usual to convert them, or "adjust them," to a time interval such as a "1-year gain" or a "6-month gain," for the visits are not likely to be exactly this much apart. Simple mathematics can do this.

Now, where to find tables or graphs to show how much the average child *does* gain at certain ages? In the past such data were almost nonexistent. Now they are gradually becoming available. (See References.) Again the *range* of average gains should be used.

A further word of warning (particularly in working with gains): Curves and tables are presented as averages of large numbers of children. Hence the curves will be "flattish," since they contain information on very large and very small children. The individual child's own curve may be or will be much wilder looking.

5. Interpretation of both a combination of *size* at a certain age and how *fast* growth is occurring will give information to the pediatrician far more useful than either alone.

6. In problems of growth, assessment of the maturity status and use with (5) will aid even more.

7. The hereditary influence on growth is very strong. Both size and maturity status are affected by heredity. Therefore information on parental size and maturity (when in childhood) is most important and should be recorded. In addition, small and large people tend to marry persons of their own size and hence promote their body form.

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DEVELOPMENTAL APPRAISAL OF INFANTS

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In this busy do-it-yourself era the busy mother has her education in infant developmental appraisal offered to her beside the column on advice to the lovelorn. Her own better judgment may be distorted by such parameters of performance in popular sources, and mothers are perhaps too prone to go strictly "by the books." If her offspring cannot be ahead of all the other children in the neighborhood, she at least wants Junior to be a developmental conformist. If she does not see genius in her child, she consoles herself with the false notion that gifted children are unbalanced anyway. Mediocrity is often acceptable, but the mere thought of retardation is liable to throw her into a panic. Furthermore, her notions of just what constitutes retardation, its consequences and what can be done about it are often an odd study in contradictions. Your efforts at preventive pediatrics along these lines may simply take the form of anticipatory guidance and professional alertness to the possibilities.

WHAT IS NORMAL?

Parents are often not aware of the great variations of so-called normal in some areas, although they readily accept them in others. Thus Lilliputian parents see nothing abnormal in the fact that their offspring still takes size 12 clothing at age 15. Let their child fail to walk or sit up at a certain age, however, and these same parents fail to recognize that this, like the small stature, may also be a matter of individual normality, the one hereditary, the other perhaps more complicated to explain.

Whatever mothers may think, we as physicians are very much aware of the vast variations of so-called normal findings in almost all things medical, but particularly in growth and development. Part of our job in this field, as in many others, is to distinguish the normal from the abnormal, the important from the unimportant.

APPROACH TO THE SUBJECT

Consideration of some general principles can often give us a few valuable concepts which we can remember. In this way we may be able to recall the details more easily and give practical clinical application to our subject. However, the problem is easy to see—namely, the inability of most of us to make a clinical on-the-spot application of what is known. It is this problem which we propose to attack.

A worth-while approach in a method which is primarily for the practitioner might be one in which mental "gimmicks" are used to make the subject more practical. These, along with a discussion of some of the general principles, should be of help in learning by association a relatively few, readily available means of developmental evaluation. They should be things which can be incorporated into the general pediatric examination, be easily remembered and require little or no special equipment. We do not expect this approach to give anything more than a rough estimate of the developmental level. Furthermore, we would like to emphasize that it is at present doubtful whether any form of examination or testing can be reliably depended upon to be truly predictive.

GENERAL PRINCIPLES

It is convenient to assess development along four lines of growth: (1) motor behavior, (2) adaptive behavior, (3) language, (4) social behavior. It is true that these may overlap, but the concept is good and should be kept in mind as the general principle behind assessments.

The most fundamental principle involved in infant development, applicable especially to motor behavior and partially to adaptive behavior, is the concept of cephalocaudal development. In other words, growth in these areas is from the head downward. When this principle is applied where only pure motor development is considered, it offers an explanation of why the mentally retarded may readily learn to walk and otherwise "use himself" in a gross manner and still be unable to learn to tie his shoes. In general, adaptive behavior and language development are more closely related to the mental process than gross motor or social behavior.

This same principle of cephalocaudal growth may be applied in another aspect. Within a given group individual children may show a wide distribution of attainment at a certain age. Nevertheless the order of attainment will be more or less constant in each. Thus, in general, the child who sits late will stand late and walk late, and the one who is precocious in sitting will also walk early. The Negro child will often be a month or so advanced over the white in motor development, but his order of *progression* will be the same.

Another principle which is important in the entire field of developmental appraisal, but particularly as it applies to adaptive behavior language and personal-social behavior, is the concept that children of all ages learn by example and are nurtured by affection and attention This explains why the neglected intelligent child may seem dull while

the one who is retarded, but has been given good care and much attention, may appear brighter than he actually is.

In any assessment one must weigh two factors—what the child *wants* to do and what he *can* do. At 20 weeks of age, for example, the "normal" child wants to reach out and grasp a toy, but his motor mechanisms and coordination are so immature that he only extends his arms in the general direction of the object and waves them about. Later he will be able to do what he wants to do and actually take the toy. The spastic child may want to do these same things at this age, but may never accomplish them, or only slowly do so, simply because his motor mechanisms do not develop properly. Such a damaged child, then, may not be retarded except as he functions in his motor abilities.

It is helpful to remember that when growth is occurring at a high rate of speed in one area, it may be slow in others. This explains "spurts" of growth in various areas at a variety of chronologic ages. Thus language development, for instance, is slow at about a year of age, while locomotion is being rapidly learned.

METHOD OF ASSESSMENT

We have chosen to consider the developmental assessment of the child from three months to two years of age along the four lines previously mentioned—motor behavior, adaptive behavior, language, and social behavior—without specifically separating them in the text. As a concession to simplicity and practicality we have listed the various items at intervals of three months. If these intervals seem long, it is well to remember that our tools of measurement are not very fine.

Gross motor development will be presented as it is manifested in posture and locomotion. Principles of behavior with cubes or toys will be utilized to evaluate *adaptive behavior. Language development* includes all forms of efforts at communication. *Social behavior* can best be understood in terms of certain basic psychological principles—concepts of self, awareness of others, motivation of expression and of needs and desires, and so on. Although these will not be discussed, the reader will find it of help if he simply keeps them in mind in a general way. The items which are listed are grouped, but have not been separated into the four areas of behavior. This, too, was a concession to simplicity and practicality. Choice of items was based upon facility of elicitation and ease with which "standards" can be recalled by the examiner.

THE EXAMINATION

The developmental appraisal can be made a casual part of the general pediatric examination and can be remembered better if it is reasonably systematic. Posture and locomotion may conveniently be investigated first, beginning with determination of whether or not the baby can hold his head up, sit, crawl, stand, walk, run or climb. Adaptive behavior can be assessed by observing what he does when you present a tongue depressor to him. At first he simply looks at it, later reaches with both

hands, then with one hand, first with a "mitten" grasp, then a "scissors" one, and finally a thumb-to-index-finger one. So far as socializing is concerned—Does he smile? does he cry when you hold him? is he cranky or is he friendly? His mother can tell you about his language if he refuses to perform for you, but does he seem to know his name? can he make a phrase? We suggest the following items as important stages to be remembered in attempting to make a rough evaluation of development.

The days around the age of *three months* are "the awakening and watching days" (Fig. 3). The infant can hold up his head and lift it

Fig. 3. Three months: "the awakening and watching days." He is aware, watches his fingers, smiles and seems to know his mother, coos and anticipates his bottle.

and his chest when placed flat upon his abdomen. At this age he "regards," watches his own fingers, fixes his eyes upon objects which seem of interest to him. He watches only momentarily, however. By now he is becoming sociable—recognizes his mother, anticipates feeding and can coo.

Six months is "the reaching, squealing and grunting age" (Fig. 4). He rolls over, may sit, and can reach unilaterally with purpose. Grasping also becomes purposeful, and he promptly transfers objects to his mouth. The grasp is "mitten-like," and he loves to bang and rattle. Strangers are distinguished from other people about him. He squeals, growls, strains, excites and vocally expresses pleasure and displeasure.

Fig. 4. Six months: "the reaching, squealing, grunting age." These are the hand-to-mouth days when he rattles, bangs, pats and reaches. He may seem distrustful when you pick him up.

Fig. 5. Nine months: "sitting and apprehensive, but he knows his name." He "bye-byes," claps noisily, recognizes people familiar to him, but may be fearful of strangers.

At *nine months* of age he is "sitting and apprehensive, but he knows his name" (Fig. 5). He has a radial digit ("scissors") grasp, can crawl, transfers from hand to hand, sits indefinitely and steadily. He may "pat-a-cake" or wave "bye-bye" or clap in response to being spoken to and will often express recognition vocally. The appearance of a stranger may be a frightening experience. His vocalizing consists of many vowel sounds, "dada" and "mama" (not necessarily meaningful), and he imitates noises. He understands "no, no" and recognizes his own name.

At a *year* of age he is "a friendly ham with both feet on the ground" (Fig. 6). He pulls up and may stand alone, may walk a step or two and usually creeps. Now he may drop an object intentionally, place a cube in a cup, rattle a spoon in one and can mark with a crayon. He

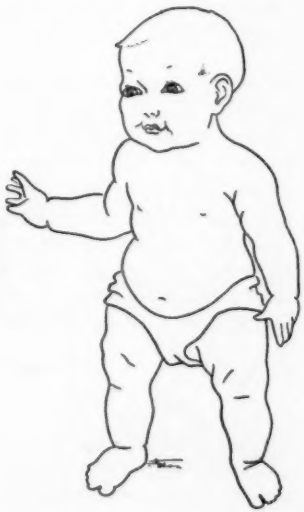

Fig. 6. One year: "a friendly ham with both feet on the ground." He creeps, pulls up, stands alone, may walk a step or two, points with his index finger and performs for anyone who will pay attention to him. He knows a couple of words and will try others if you will repeat some for him.

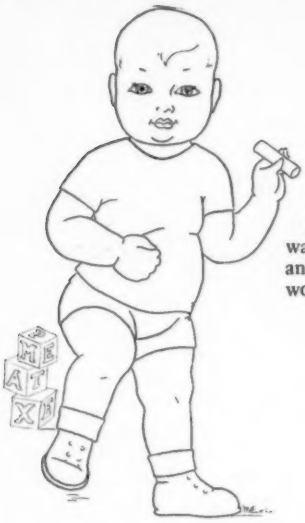

Fig. 7. "The dart, dash, fling and pick age." He walks well, will release and drop things upon request and has a "pincers" grasp. He still knows only a few words.

approaches objects with the index finger, tries to use a spoon and helps to dress himself in a clumsy sort of way. Although very sociable and often serene and friendly, he is easily enraged. He now knows two or more meaningful words other than "mama" or "dada" and recognizes his own name in a sentence. He tries to repeat familiar words.

Fifteen months is "the dart, dash, fling and pick age" (Fig. 7). He now walks unaided, builds a two-cube tower, releases upon request, drops a cube into a cup, has a "pincers" grasp with efficient use of the

Fig. 8. Eighteen months: "the terrible-tempered toddler." He is into everything, runs, climbs stairs, pulls toys on a string, scribbles, cannot keep his mind upon anything for more than a few moments at a time. He has about 10 words in his vocabulary, but overworks one of them—namely, "no."

Fig. 9. Two years: "tranquil two." Now he is affectionate and sweet, goes up and down stairs unassisted, runs, climbs onto chairs, builds "trains" and points to pictures of things named. He begins to call himself by his own name or "baby" and has often acquired a vocabulary of dozens of words, and uses phrases.

index finger and thumb. He shows his shoes and knows three or more meaningful words, other than "dada" or "mama."

At *eighteen months* of age he is "the terrible-tempered toddler" (Fig. 8). He can now get up from the sitting or prone position with ease, run stiffly, pull a toy on a string and climb up stairs. He can build a tower three or four cubes tall, put a lid on a box and may scribble in imitation with a crayon. He will point out parts of a doll and, if given a book, turns the pages several at a time. He is often toilet-trained in the daytime and is less messy when feeding himself. His attention span is very short, and he has no concept of sharing. At this age he is easily frustrated and is constantly saying "no." He can often name pictures and has about 10 words in his vocabulary.

The age of *two years* can be thought of as "tranquil two," a relief after the recent display of ill nature (Fig. 9). He may be able to stand on one foot, go up and down steps without help and usually spends much time running and climbing. Blocks can be built into a tower six or seven cubes tall, or they may be made into a train. He loves to fold paper and may use a chair to climb and reach for high objects. He becomes more affectionate. His vocabulary now consists of dozens of words, and he uses phrases, knows his own name or "baby," refers to himself by name and calls out the names of objects. He often understands two prepositions such as "in" as contrasted to "on" and points to pictures named.

SUMMARY

The milestones of growth and development are well known. If these facts are to be clinically applicable, they should be incorporated into the routine pediatric examination. This procedure is simple, requiring

no special equipment, if the physician can make a few of the details a part of his store of common medical knowledge. The preceding pages represent an effort to present certain steps in normal development of the infant in such a manner as to make the appraisal of their performance a practical office procedure.

ACKNOWLEDGMENTS

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IMMUNIZATION

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New parents usually have a deep sense of responsibility toward their child. They are anxious for help and open to all suggestions which lend assurance in support of their resolutions "to do everything right."

The newborn period is the time when a physician can give some of his greatest service by counseling, guiding, advising. The parents have questions about feeding and handling, but they also want to know what is expected of them and what they can expect of their physician in case of illness. Statements about what can be done to prevent disease are also welcome, so that it is now appropriate to outline roughly the immunization program. Many physicians dispose of the matter by simply offering a printed instruction form which answers common questions and outlines immunization schedules. There are those, however, who hold that this practice does not show specific interest in the individual. Furthermore, the printed forms get outdated fairly easily, since policies change.

Before the mother and her infant leave the hospital the parents should be told that their baby should be immunized against whooping cough, diphtheria, tetanus, smallpox and poliomyelitis, starting at a definite age. It is not enough merely to say, "We gotta give him some shots when he gets older."

FIRST VISIT

The first office visit should be at one month of age and should include a complete examination, evaluation of growth, feeding and adjustment. Preventive procedures should again be discussed. Immunizations, vitamins and accident prevention have so much in common that an intelligent parent should consider them together. If the first visit is at age six to eight weeks, the first immunizations may be given.

Young parents are often ill informed. Many, for instance, will be pleased to learn that reactions to immunizations are less at an early age. Most of them do not know how serious pertussis can be when it

occurs in the young infant. Simple information such as this helps them to understand why preventive measures should be started early.

SECOND VISIT

Immunizations are started when the infant is two months old. If the infant is older and has had his first immunization, the second one is given after the examination and discussion. Since the infant's immediate reaction to pain is usually short, it may be worth while to emphasize that the pain is not great. At this time, too, it is wise to mention the foolishness of threatening a child with "shots" or of undue display of concern over the discomfort associated with receiving them.

SUBSEQUENT VISITS

The immunizations are usually given after the regular examinations. Young parents of modest means may be timid about the cost of immunizations. If so, this should be discussed with them. If health departments, churches, employers or military service make immunizations available and the patient is eligible to receive them through these sources, it may save embarrassment by mentioning this. The infant will thus become immunized and also receive the benefit of proper private care. Otherwise one or both might be neglected.

"IMMUNIZATION HOURS"

Some very good parents with more than one child may not wish to have monthly examinations. In order to render the best service you can under these circumstances it is well to make a time available for immunizations. They may be given when the physician is not present, provided the nurse uses reasonable care in screening sick children and in asking about previous reactions and is trained to ask the physician when in doubt. If "immunization hours" are held, the intelligent nurse will not keep children waiting, will not expose the crying baby to the ones waiting for immunizations and will give individual attention and routine advice to each patient. The "routine advice" is as follows:

1. The site of a smallpox vaccination is not to be covered with a dressing. Watch for redness the fourth day. Fever may develop on the fifth to ninth day. Aspirin may be given. If the child is very ill, check with the physician. If no reaction is noted from the third to the tenth day, notify the office.
2. For other immunizations give aspirin upon arrival at home and again in four hours if there is fever. This should be figured on the basis of 1 grain for each year of age and the exact amount mentioned, e.g. one half of a 1¼-grain tablet of "baby aspirin."
3. If the site of the injection is red or hot, an ice bag may be applied.
4. Call the physician if the child seems listless or acutely ill.
5. Return on a definite date for the next examination.

EQUIPMENT

There is no ideal list of equipment, but it should be as simple as possible with a minimum of chances for breaks in technique. It should be easy to clean, simple to use and conveniently located in the office. Cost of upkeep and replacement should be weighed against the initial cost. The type of practice, number and training of employees and special interest of the physician will determine what is best suited. It may be well to recheck from time to time, for a certain office routine developed for certain personnel may not work as well for others. New ideas are being introduced and should be considered. More specific details are included elsewhere in this volume (see pp. 375, 383).

PROCEDURE

The exact plan of procedure will vary with the office and type of personnel. It is a good idea to have the routine well defined. In fact, if there are chances that personnel may change, the plan should be in writing. Upon receiving the "order," such as one for DPT (diphtheria, pertussis and tetanus) and poliomyelitis, written on the charge slip, the nurse will take the proper vial from the refrigerator, insert a large needle connected to a sterile 2-cc. syringe and withdraw the proper dose. The syringe and that needle are then disconnected, and another dry needle, a smaller one, is affixed.

The area selected for injection, such as the upper outer quadrant of the right buttock for the second DPT, is cleansed with alcohol. The needle is inserted quickly, tested for entry into a vessel and the antigen injected. This is followed by 0.1 to 0.2 cc. of air. The needle is then quickly withdrawn, being careful not to spill any antigen along the tract. Gentle pressure over the site will prevent oozing of blood. Do not massage.

Reassurance along with cheerful and friendly comment from the nurse will quickly soothe many children and is far superior to exaggerated sympathy by nurse, attendant or parent.

If the needle and syringe are not of the disposable type, Coleo Solution should be drawn into the syringe and expelled. The needle may be stuck into a square bath sponge. This sponge, containing the needles, may later be transferred to the sterilizer and boiled with the needles in place. They may then be removed and placed in a Petri dish or proper container ready for use. The syringes, after proper cleansing, are placed in the sterilizer for boiling and after boiling are removed and stored in a sterile container. If an autoclave is used, needles and syringes should be packed in containers, cloth pockets or paper towels and placed in an autoclave.

PROCEDURES AND RECORDS

There is no evidence that the pediatricians in this area are regimented so far as immunization practices are concerned. In checking various

offices it is found that there is much variation in the manner in which immunizations are given and the type of records kept. Each has merits, and there seems to be no "best method." Nevertheless each office should have a well outlined procedure. The following check list covers the most important points to be considered in any office.

1. The person giving the immunization should:
   (*a*) Mention the type of immunization to the parent and ask whether there have been any reactions to previous immunizations.
   (*b*) Repeat advice about aspirin for febrile reaction and tell the mother to notify the physician if there is any other reaction.
   (*c*) Ask whether any other advice from the physician is desired or whether there are any questions.
   (*d*) Record the type of immunization and the date it was given on the patient's chart.
   (*e*) Record the type of immunization and the date it was given on the patient's card if one is carried.
   (*f*) Give an appointment for the next immunization if it is to be in the near future.
   (*g*) Ask the patient or parent whether he wishes to be notified when the next immunization or booster is due. If he does, a notification card is filled out and placed in the file for the month during which it is to be sent.
   (*h*) Make a final check to see whether the patient is quiet, whether more instructions are needed, and so forth.
2. The patient's chart should have a definite place for recording of all immunizations.

It is a good idea to give the patient a record of his immunizations. Much time may be spent in filling out various record blanks only to find that they are soon misplaced or are never used. I have had various forms printed, but find that they are requested only when the patient is leaving town or is transferring to another physician. There are many sources from which one may obtain an adequate record card for this purpose. A neat health and immunization record is prepared by Eli Lilly & Co. It is about 3 by 5 inches and has a place for a brief record of contagious diseases, allergies, surgical procedures and immunizations. There is a recommended schedule of immunization with an adequate note that these immunization procedures may vary.

ADOPTING AN IMMUNIZATION SCHEDULE

Much individual variation of the immunization schedule is permissible. There are many variations among the local pediatricians even though we all have the same hospital appointments, have meetings frequently and most of us have a similar background of training. In any case there are certain matters which one should take into consideration:

1. Have your routine procedures definitely outlined in writing, so that all members of the office staff can refer to them.

2. Recheck the routine as procedures and personnel change. A routine of 10 years ago is now obsolete.

3. Plans for immunization procedures may be obtained in various ways. The Report of the Committee on the Control of Infectious Diseases may be obtained from the American Academy of Pediatrics. Local health departments usually have a definite schedule which may be adaptable to a private practice. Special information may be obtained from various sources when a new vaccine is introduced.

Present Immunization Schedule (1961)

2 months—Diphtheria, pertussis, tetanus (DPT)
Poliomyelitis: Mixed with other antigens
May be given separately
May be given a few days later during "immunization hours"
3 months—DPT and poliomyelitis
4 months—DPT and poliomyelitis
5 months—Smallpox
10 months—Poliomyelitis
18 months—DPT
2 years —Poliomyelitis
4–5 years —DPT, poliomyelitis, smallpox
8–10 years—DT (adult type), smallpox, poliomyelitis

SPECIAL IMMUNIZATION PROCEDURES

Special indication for influenza immunization may arise, and the policy can then be formed. Immunization for typhoid is still a part of the routine in many localities and can be started early if desired. A special file should be kept by the physician on infrequently used serums. This should include (1) procedure for handling animal bite cases with antirabies serum; (2) hyperimmune pertussis gamma globulin; (3) hyperimmune mumps gamma globulin; (4) vaccinia hyperimmune gamma globulin.

CONCLUSIONS

Procedures change, so that the types and methods of immunization should be reviewed frequently and adjusted as necessary.

The need for early immunizations, and the benefits, along with possible reactions, should be carefully discussed and explained to all parents.

Records should be given to the patient. Adequate records of administration along with results or reactions should also be kept on the patient's chart.

Much of the actual work may be delegated, but it is of such importance in practice that the physician must never allow immunization to become completely routine.

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DRUG THERAPY IN OFFICE, CLINIC AND HOME

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The ultimate expression of a physician's diagnostic capacities and skills lies in his therapeutic ability. Thus his capacity to help the patient is reflected in the advice, the drugs and other agents he prescribes and the way in which they are administered. True, many diseases are self-limited, and the patient would get well without medical consultation or treatment. In all cases, however, the competent physician can help in many ways either to cure the patient or to make the process shorter in duration or more easily tolerated.

The ultimate and direct responsibility for administering to patients rests in the patient's physician—the physician of his choice. The medication ordered by him immediately has a new virtue and quality. It now gains "placebo effect." This effect rides with each drug or agent—whether the drug is therapeutically active or inactive. The confidence which the physician imparts to his patient (either directly or indirectly through mother, nurse or maid) cannot be overestimated, and may outshine the therapeutic properties of the drugs. This is the "why" which makes one physician's medicine better than another, despite its origin in the same vat. This is part of the "art of medicine," which flourishes under direct responsibility for administering to a patient and his needs.

Therapeutic nihilists are always about, often more evident in word than in deed. They may be of two types, (*a*) the therapeutic pauper, who knows and offers little, or (*b*) the therapeutic giant, who knows much, but, because of his knowledge and appreciation of drugs, fears them and dispenses them miserly.

It is critical to remember that precise diagnosis permits proper therapy. In 1895 Jacobi stressed that "the first indication in therapeutics is a correct diagnosis." Incorrect therapy may completely nullify brilliant diagnosis—the chain with the weak link. Improper therapy may be expressed by poor choice of drug, lack of consideration of the pertinent factors related to the patient at hand, or improper directions

for dispensing, for administration, or incorrect storage or administration.

TYPES OF THERAPY

Specific

The gratifying results which follow when specific therapy is properly prescribed and administered are appreciated by all. Although we should like to have much more specific therapy than we do, we find that in the average office or outpatient clinic we seldom have great specificity of therapy.

Empiric

Almost every physician has treatment which "somehow seems to work." This may have originated with him or with older physicians who have taught him, or its origin may be lost. Undoubtedly, much of this therapy falls in the placebo category. On the other hand, through the years a number of effective medications have come from knowledge gained through empiric use.

Therapeutic Trial

Drug therapy may be diagnostic in some cases. For example, the response of the rheumatic joint to salicylate is a most excellent diagnostic test. Likewise, the awakening of a narcotized patient with nallorphine (Nalline) is dramatic and diagnostic of the cause for narcosis.

Supportive

In supportive therapy lies the physician's real art. Unfortunately, such therapy is most often not well taught in the busy hospital, and is learned gradually by the physician from his fellow physicians, mothers of children, nurses, pharmacists, and others. With the great majority of office patients and clinic patients, particularly if the illnesses are minor, one finds that supportive therapy is not only *all* one has to offer, but is also *everything* one has to offer.

Placebo

In regard to what has been said above, all the agents in the other four categories carry with them an added "placebo effect" which enhances their value. Seldom does one use the placebo just "to please," though one may wish to do this. On the other hand, there are other things one can use rather than drugs, such as diet, and so on. Thus the dependence on drugs to solve all situations is diminished in the eyes

of the parents whom we are training at all times. Most tonics to improve the appetite fall in the placebo class. Seldom is the pharmacist upset by the generally advertised ones, and neither are the parents, except by the price. If one wishes deliberately to use a placebo, it is always wise to give something with "recognized" though slight remedial effect. If this is not done, somehow the "upset" pharmacist, his delivery boy or his wife may betray the "secret" and destroy its therapeutic value. An example of such prescription might be:

℞
Elixir of thiamine chloride, 30.0 cc.
Aromatic elixir, q.s. 90.0 cc.
Sig: 5.0 cc. 30 minutes before meals.

An increased dose to say 15.0 cc. could even give effect (increased appetite) by its useful alcoholic content.

Withholding of Therapy

There are a number of instances in which *no* therapy in a particular area is the best therapy. This advice is more difficult to "sell" than the giving of useless and unnecessary remedies. The "selling job" becomes less difficult as confidence in the physician grows with time. As an example, the local application of a drug to the lesions of herpetic stomatitis in a patient, usually of uncooperative age, most often is followed by an oral "bloody mess." The armchair therapeutic approach of anesthetic lozenges, oral paints, and so on, fails unless reasonable measures, rectal fluids, and sedation by rectal route are substituted. These measures may result in a comfortable, hydrated patient who sleeps well, as can his parents—and the physician.

Psychotherapy

As we care for more chronic problems, psychotherapy proportionately becomes of greater importance. Measures to support the child, his family members, relatives and neighbors all reflect to aid the otherwise unfortunate child. The psychotherapy must be outlined. For example, placing the child's bed next to the window where he can watch traffic or follow the clouds will pleasurably take his time and turn his concerns away from himself. A rocking chair next to the bedside may help the tired mother to "neglect" her household chores to the benefit of herself and her more frequently rocked child. Tub baths for the smaller (or larger) children offer the benefits of hydrotherapy. These things may make the difference between a withdrawn and sullen child and one who somehow retains the "spark of life." Helping neighbors to understand that visitation by other children is permissible may fortify the family's ability to give emotional strength to the chronically ill child. The use of neighborhood resources may be more important than any of the recognized pharmacopeial armamentaria. "In the care and treatment of a sick child at any age, the psychical effect is of greatest im-

portance."[12] This quotation reveals an aspect of therapy preceding more recent attention to the child's psyche.

CHOICE OF DRUG

In choosing drugs, one must always remember that danger lurks with all therapy. No drug is completely safe or nontoxic. Water is an official U.S.P. drug, yet people die from it in many ways. Some drugs are much less toxic than others (have a high therapeutic index), but all drugs have reactions from overdosage, side reactions often "normally" seen, or peculiar reactions (idiosyncrasies) with use. The last are commonly recognized by the practitioner in his close association with the child, usually as interpreted by the mother, whose observations may or may not be correct. With a background of the patient, his reactions, his immediate disease and the patient's family and its limitations, drugs are chosen or rejected accordingly.

Few vs. Many

As wisdom and experience come with the treatment of patients, one soon learns that it is better to use a few well understood drugs than to skip from drug to drug in an attempt to find a panacea. One or two or three antihistaminics, for example, used in familiar preparations and familiar dosage will usually give results and side effects which then are meaningful to the prescriber and even to the sick child or his mother.

There are a few things one should learn about each of the drugs he uses. Just as we should read pediatrics, we should also read pharmacology, as such, and particularly learn the following about each of the drugs we commonly use: (*a*) the route of absorption, (*b*) the rate of absorption, (*c*) distribution in the body, and (*d*) excretion or detoxification. Actually, through these things and their meaning to us come our own individual dosage and frequency schedules. When these things are considered in light of the patient, his disease and, particularly, the organs involved, the resultant dosage and frequency may change appreciably from that which is generally advised. On the other hand, it is probably wiser to follow carefully outlined schemes of dosage and frequency in most cases. Also to be taken into consideration when prescribing drugs are the following: (1) the dose of the drug, (2) size and weight of the patient, (3) age of the patient, (4) time of administration, (5) drug tolerance, and (6) use of other drugs given at the same time. Reference is made to any good pharmacologic text for elaboration of these considerations. But if these are considered as we prescribe for an individual patient, we may then more wisely prescribe a smaller dose with a longer interval to a 5-pound newborn, with probable liver immaturity, than we would to a 14-pound newborn, particularly if the drug requires liver maturity for normal functioning. (Both infants are newborns; it follows that there cannot be a standard "newborn dose.")

DOSE

The epitome of dose is always to remember that "the dose of a drug is ENOUGH, but NOT TOO MUCH." This concept is easy when one has, for example, a drug with sharply demarcated end-points of action or overdosage. Thus a barbiturate given by any route may give sedation which becomes evident and desirable, but in excess dosage causes respiratory depression, coma and even death. One thus picks the range of dosage which seems most applicable. Yet it must be remembered that not all patients respond alike to the same dose, even if they are identical in all other observable qualities. The response to drug dosage is such that a frequency distribution curve of the normal type results.

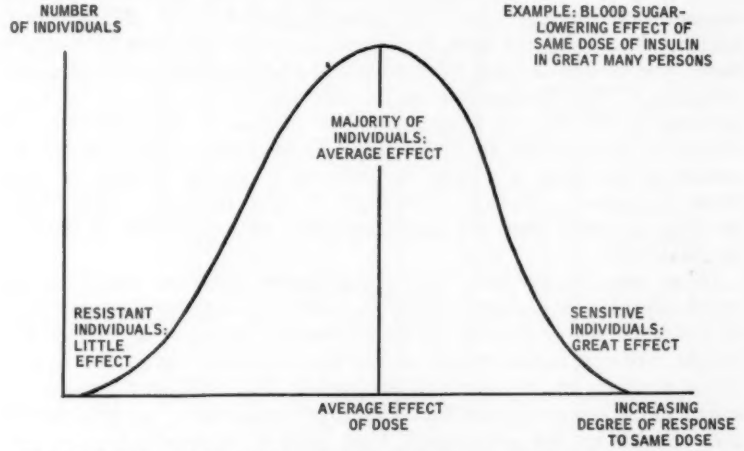
NUMBER OF INDIVIDUALS
EXAMPLE: BLOOD SUGAR-LOWERING EFFECT OF SAME DOSE OF INSULIN IN GREAT MANY PERSONS
MAJORITY OF INDIVIDUALS: AVERAGE EFFECT
RESISTANT INDIVIDUALS: LITTLE EFFECT
SENSITIVE INDIVIDUALS: GREAT EFFECT
AVERAGE EFFECT OF DOSE
INCREASING DEGREE OF RESPONSE TO SAME DOSE

Fig. 10. Relation of the number of reacting persons to graded response to the same dose of a drug. Example: lowering effect of the same dose of insulin on the blood sugar in many persons.

Thus some patients are sensitive, while others are insensitive. Most people, however, respond to the "average dose"[10] (Fig. 10). Are we to ignore the others because they lack the quality of being average?

In Figure 10 a curve is shown resulting from giving the same dose of insulin to a number of persons. Increased intensity of reaction lies along the horizontal axis, while the vertical axis shows the number of persons grouped with regard to the same intensity of reaction. Some show much response, others little. Most show the "average effect." We all remember effects associated with the number 50 as related to dosage. Thus, ED_{50} is the dose which will give the desired response in 50 per cent of "organisms" and LD_{50} that dose which kills 50 per cent. Neither of these is wanted for our patients. The ratio between these is the "therapeutic index" or "safety index." Some drugs have a wide degree of safety; therefore we can get more patients to respond with an in-

creasing dose without rapidly approaching danger. These values should be considered as each new drug flows out on to the market.

We generally use "average doses." How does one find the average dose for the child? More frequently the adult "average dose" is available or even carefully determined, but often the child's dose is calculated from this, rather than being determined independently.

Calculation of "Average Dose" for Children

There is no one dose for all children who by usual methods of measurement would appear exactly the same. Each dose ideally should be tailored to each child. The physician may give less or more, according to his judgment, for the dose of a remedy must be varied in the same manner that the size of a coat must be varied to fit each person.[5] Earlier,[6] dosage did not seem to play an important part, but by Koplik's time[8] "the dosage of drugs for infants and children [had] received much attention." This "therapeutic lag" is not unusual in spite of an early recognition not only of dosage, but also of lack of proportionality of dosage to body weight by Hufeland in 1830.[1] Many rules exist for determining the dose of a drug for patients of various weights or age. Some are Clark's, Young's, Cowling's, Fried's, Bastedo's, and others. By their number they are testimony that no single rule is entirely satisfactory.[15]

Doses based on age have limited application when one considers the variability of size (weight) within a given age—e.g. the normal range of weight at age 5 years is 34 to 53 pounds (boys).[18] By experience, weight, likewise, is not reliable if one remembers the adult dosage and scales it down to the small child (usually the calculated dose is insufficient). Conversely, the adult dosed by comparison (weight) to the dose reliable for the small infant finds himself overdosed.

During the last 10 years much attention has been paid to drug dosage, particularly as related to the surface area principle.[1, 3, 4, 20] As Snively[17] states: "The close correlation between body surface area and various physiologic processes is not accidental." Among these processes are cardiac output, glomerular filtration, respiratory minute volume and blood volume, to name a few. Clinically, the use of body surface area in relation to drug dosage has become an *important* and *simple* method in the calculation of dosage of drugs and fluids for varying sizes and ages of children.[1] Tables[15, 16, 22] and lists are available with doses given by this method and on the basis of body weight. Many of the larger pediatric teaching centers and hospitals have adopted these methods of dosage. Objection to the use of surface area for calculating parenteral fluids has been recorded[11] and in return discussed.[1] "The present state of knowledge suggests that consideration of their clinical validity and usefulness rather than their 'scientific validity' is more rewarding."[1]

With the West nomogram (Fig. 11), when the height and weight are known, a straight line across the outer arms of the nomogram (at the appropriate height and weight) will cross the surface area arm at

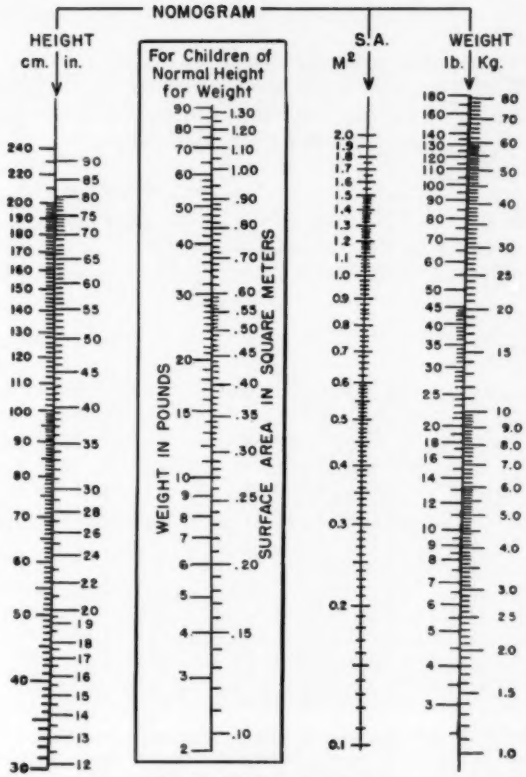

Fig. 11. West nomogram.

the correct point; or one may use the enclosed area to take the surface area directly from weight for children of normal height and weight. Thus, by knowing the child's surface area, his dose can be determined as a fraction of the known adult dose. The fraction is determined by making the child's surface area the numerator, and the adult surface area (1.73 or 1.7 square meters) the denominator. Thus,

$$\frac{\text{Surface area in M}^2\text{ (child)}}{1.7} \times \text{adult dose} = \text{child's dose}$$

or, knowing the dose per square meter,[15, 16, 22]

$$\text{Surface area of child (M}^2\text{)} \times \text{dose per M}^2 = \text{dose for child.}$$

The simplicity of this method is most appreciated in instances in which different dosage for 4 age ranges is recommended, e.g. (pinworms) piperazine citrate,[15, 16] whereas the simple dose of 1 gm. per square meter will satisfy all ages and weights.

For physicians who know the adult dose the determination of the percentage of the adult dose for a child of known weight may be taken

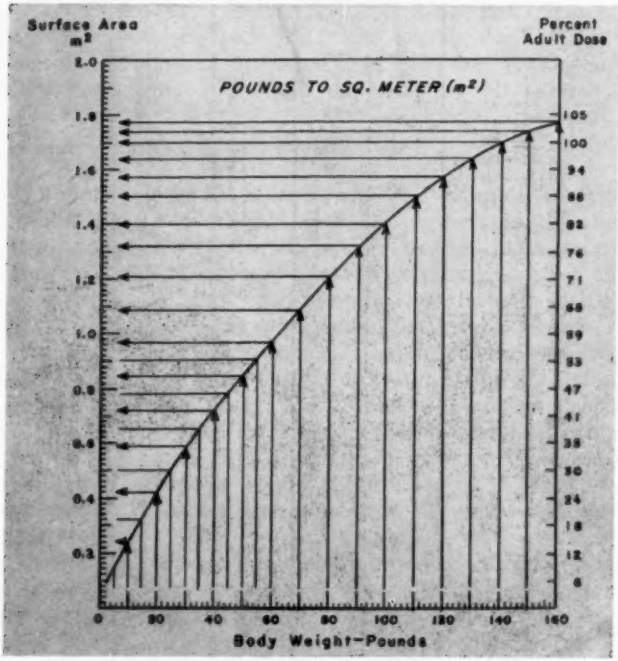

Fig. 12. Relations between body weight in pounds, body surface area and adult dosage. (From Talbot, N. B. et al.: *Metabolic Homeostasis—A Syllabus for Those Concerned with the Care of Patients.* Cambridge, Mass., Harvard University Press, 1959.)

directly from Figure 12.[19] The surface area of the child can also be taken directly from Figure 12.[19]

Although offered here only as a rough guide for comparison, the following conversion rules may be useful.

Pounds ÷ 2 (or 2.2) = kg.
Grains/pound ÷ 7 = gm./kg.
Gm./M² ÷ 30 = gm./kg.

By using these methods the "average dose" is determined. This need not be the "correct dose" for the child at hand, although it is likely to be. It is still the "average dose."

One cannot be lulled into security by the fact that a method for dosage appears scientific or valid. Any rule only determines the "average dose." What is correct for each patient?

Frequency of Dose

Thus far we have chosen the drug and determined its dose. Now to choose the frequency of dose. The choice of the particular drug for use may be made on the frequency or the interval which is allowed between doses. This varies with the route of administration. Although these facts are usually given with the dose, the frequency or interval may vary with the patient or his response (clinical observation) or be measured by other determination in some cases (laboratory) (e.g. sulfonamide level). The maturity of the organ involved in detoxification or excretion and its state of health will affect frequency.

FORMS OF MEDICATION

Although the forms are decided to a large extent by the major pharmaceutical firms (with the aid of children's or juvenile taste panels), there are many standard and classic preparations which have withstood the test of time and competition of proprietary preparations to remain available for general use, although they themselves are not supported by advertising. A brief summary of practical points follows.

Liquid Vehicles (Principal Preparations)

AQUEOUS VEHICLES. *Aromatic Waters.* These are essentially water plus a pleasant flavor. Anise (licorice), fennel, cinnamon and peppermint are pleasant vehicles useful to dissolve water-soluble chemicals or to dilute water-miscible liquids.

Syrups. These are sugar and water with or without a flavoring agent or active constituents. Simple syrup contains no flavor. Flavored syrups are citric acid (lemon), tolu balsam, chocolate, cherry, cinnamon, eriodictyon (yerba santa) and raspberry. They may be used like the aromatic waters or mixed with other nonalcoholic liquids. Both of the foregoing classes are excellent vehicles. The syrups are especially fine for children and offer the child and the physician a choice of delicious flavors. (See extemporaneous prescribing below.)

ALCOHOLIC VEHICLES. *Elixirs (Spirits).* These are sweet alcoholic preparations comparable to syrups in nature and use. Their alcoholic content need cause no concern. Because some physicians fear alcohol for children, manufacturers may name a particular product as syrup rather than elixir. Some elixirs contain active therapeutic substances, e.g. phenobarbital elixir. The flavoring elixirs are anise (licorice), aromatic (orange), cinnamon, peppermint, spearmint and lemon; others may be made.

Liquid Preparations with Drug Action

AQUEOUS. *Solutions.* These are active chemicals in water, e.g. potassium iodide. boric acid.

Suspensions. These contain insoluble chemicals in water and must be shaken before use (usually internal).

Lotions. These are like suspensions, but for external use, e.g. calamine. Suspensions and lotions can be stored with the bottle lying on the side, to permit distribution of the insoluble solid in the liquid on shaking.

ALCOHOLIC. *Tinctures.* These contain plant or animal parts dissolved in alcohol. They vary in concentration. The poisonous ones contain 10 per cent of active drug (belladonna, digitalis, and so on).

Fluidextracts. These are like tinctures, but stronger; e.g. 1 ml. of fluid extract equals 1 gm. of drug (100 per cent).

Solid Preparations

ORAL. Tablets and capsules are not intended for small children and are given with danger. The powder content of capsules may be given to small children, as may powdered medicine when properly prepared. After age five years enough cooperation may be expected to try solid medication. Toddlers who refuse solids can swallow them. They can and do thus poison themselves.

TABLETS. Tablets are compressed with a machine and are usually purposely made to crush only with difficulty, and thus are not made for crushing. If this must be done at home, the tablet can be placed between two spoons and powdered to be mixed with syrups, honey, jam, and so on, for administration. Soft tablets are available.

CAPSULES. These may contain powder, liquid or granules (spansules). They may be opened for small children and their contents mixed with something for oral use. The something may be applesauce, apple juice, syrup, chocolate, honey, cinnamon, brown sugar or other household flavors.

PILLS. Pills have generally disappeared. The term is archaic from a pediatric point of view.

Medication for Orifices (Other than Oral)

SUPPOSITORIES. Suppositories are made for insertion into cavities. Those in use are the following.

Rectal. Cocoa butter base suppositories (rectal) melt at body temperature and release their active drug.

Noncocoa butter base suppositories require moisture and cannot be depended on in dehydrated children. Since the rectum is often filled with stool, to depend on rectal medication, one needs to give a clear enema (not soap or other irritating substance) to empty the rectum to permit absorption and to avoid the suppositories' being "lost in the mud." Cutting suppositories may be dangerous when dividing doses, since all the dose may be in the tip. Aminophylline often poisons by this route. All active drugs may do so.

Vaginal. These are generally contraindicated, but adult urethral sup-

positories may be divided in length for administration. They are about the size (diameter) of a soda straw. Unless prepared by special means, most of the medication may be located in one end.

Drops. Nose, eye and ear drops may contain varied drugs and vehicles. Aqueous preparations may grow fungus and should be clear before use (hold dropper to light). Bottles should not be refilled or used for more than one person.

Solid Preparations for External Use

Ointments are fatty or petrolatum bases with or without drugs.

Pastes are ointments plus a drying agent (e.g. starch).

Creams are like ointments, but have water-soluble bases (can be easily washed away).

PRESCRIBING OF DRUGS AND PRESCRIPTION WRITING

The Prescription

The prescription should be written on a blank free of advertising by drug stores, bottling works, and the like. Peculiarly, many physicians write on blanks that contain advertising for someone, yet would not think of permitting this advertisement on their letter paper, office window or car. The prescription is a potential legal document, as is the hospital chart. Preferably already printed is the doctor's name with abbreviation of medical degree, his office address, federal narcotic registry number and blank for the age of the child. The telephone number must be present so that the pharmacist may call if a question arises. Even though the pharmacist may deflate our egos by catching or suggesting our mistakes, he deserves a few words of appreciation, not scorn. Appreciation will result in a valuable ally in the medical and lay community. Scorn will result in the reverse and, more important, few or no telephone calls, thus losing the checking function the pharmacist may vitally serve to prevent mistake and possibly death. Medication errors are more easy of study in the hospital[14] and usually result in less community notoriety than those outside. There is no need to use formal Latin, which now upsets both physician and pharmacist. Latin abbreviations, by frequency of use and custom, are permissible (e.g., t.i.d., p.c., a.c.). The prescription should be individualized for the patient, hand written by the physician in ink and not previously typed or printed.

When prescriptions are telephoned, they may be so given in response to the phone call of the pharmacist. This saves the physician's time and assures speaking to the pharmacist. The patient may be instructed, "Please ask your pharmacist to call." Rarely a pharmacist resents this, but if so, another usually will be glad to call. If in one particular area four of five pharmacists are known to be professionally excellent, the physician may "inadvertently" omit the fifth name should he ask the parent to whom to call the prescription. Written prescriptions may be simple and follow like a letter to the pharmacist. A carbon copy may be made.

The age or weight of the child should be plainly written. The whole of the prescription should be written to be read. One of my students showed me a very illegible note on a doctor's prescription blank for which ichthyol ointment 5 per cent was dispensed with directions, "Use as directed." The note was intended for the school teacher and read, "May return to school."

A definite indication of the restrictions as regards refilling should be noted. Some prescriptions are refilled years after the physician who wrote them has died. Their use may pass from generation to generation like a family heirloom or ritual.

Reducing the Prescription to Writing

After calculating the single dose and the duration of therapy (or a trial of therapy) the total for this interval of time is ordered. This is easier in the case of solids than liquids. For solids the calculations are best done by the pharmacist. For example:

℞
Phenobarbital ..... 15 mg.
Codeine sulfate ..... 20 mg.
Acetylsalicylic acid .. 300 mg.
Carmine q.s.
Make 10 such capsules
Directions: Take one every 4 hours for pain.

Note that in this particular prescription carmine was added to make the powder in the capsule pink. The pharmacist will add what is needed. Capsules may thus be colored with many acceptable colors for internal use; a few are mentioned here: carmine (pink to red), chocolate (tan to brown), chlorophyll or active plant drug (green) and a number of food colors (green, yellow, and so on). The use of such colors may again add to the individuality of the prescription and the prescriber and avoid the patient's (parent's) feeling that "Doc always gives the same white capsules for everything."

Liquids may be similarly colored. Liquid preparations may be made of dissolved chemicals plus vehicles in which they are soluble or by adding separate liquids together. For example:

℞
Chloral hydrate ..... 5.0 gm.
Cherry syrup to make or (q.s.) .. 90 ml.
Mix
Label (directions): Teaspoonful at bedtime, repeat once if necessary in 2 hours.

Fourteen doses (2 weeks' supply) of 0.3 gm. each are desired. Bottles hold 6, 12, 18, and so on, doses (6 doses per 30 ml.). We choose 18 doses to allow for repeated doses:

$$0.3 \times 18 = 5.4 \text{ gm.}$$

This is "rounded off" for greater accuracy to 5.0 gm. (although 5.4 gm. can easily be weighed by the pharmacist). Note the words "to make."

It is best to always use this for the final item which fills the bottle. Were the physician to omit the word "mix" or "label," of course the pharmacist would do this. Prescription writing need not be complicated.

Quantities to Prescribe

When potent substances are prescribed, it is well to consider two things. The child may take all the medicine at one time and be poisoned, or may continue the treatment longer than desired if the prescription is written for an amount so permitting or if no restriction is written into the directions. Printed on the blank may be N.R. (not to be refilled), 1, 2, 3, 4, Inf. The physician may circle the desired indication. If he *always* circles N.R., the order may or may not be honored, but if it is not *always* circled, the greater chances are that this order will be *always* followed.

It is better to prescribe the minimal number of doses needed and allow the prescription to be refilled if needed, but if long use of the prescription is anticipated, original bottles (as supplied by the manufacturer) may be ordered for savings to the patient. For poor patients the prescription may be marked or the pharmacist called. He is more likely to reduce his fee if the physician has set the precedent.

Stable preparations (especially if likely to be used again) are preferable to ones less so. A small amount left may be sufficient for a "starting dose" for a subsequent need.

Drug Incompatibilities

The simplest way to avoid reaction between ingredients of prescriptions is to avoid mixing proprietary or patented preparations containing more than one substance. It is preferable, if several drugs are used, not to mix them, but to prescribe them separately and mark them for identification. Unless one is well versed in the possibilities of incompatibilities, it is best to avoid mixing; but if mixing is necessary, one may follow Fantus's[5] German proverb: *Probieren geht über's Studieren* (a trial is better than much study).

Use of Proprietary and Patent vs. Compounded Preparations

Today few items are actually mixed by the prescription pharmacist. Somewhere lost is the term "Misce et fiat secund. art." (mix and prepare according to the art). Today its liberal translation might be, "Pour from the company's bottle into your own." But all the many years of the art need not be lost to us. The truly worth-while past persists, to be found by him who searches. Many of these virtues of the art cannot be utilized by the physician in the large city. His prescription may go out to an unknown apothecary. If many physicians used the remaining "essences of art," all could profit. The physician in the small community or suburb by previous understanding with pharmacists

can offer his patients a number of delightful syrups, waters, elixirs, and the like, which by use will be kept fresh and delicious and give individuality not only to the patient's medicine, but also to the physician's prescription.

On the other hand, long ago the large pharmaceutical houses, realizing the tremendous sales potentiality, catered to children's medications. Thus the various pediatric syrups, suspensions, and so on, follow actual taste testing by children. The parent drug is available in tablet, capsule or other form (not safe for small children). The capable and ingenious pharmacist (there *should* always be one in a children's hospital) can use acacia syrup or other suspending agent to suspend the new drugs in preparations acceptable for small children. Since most of the recognized drugs and their preparations are either proprietary or patented (even though U.S.P.), the greater volume of prescribing will fall to this group.

The already prepared preparation may be best for your patient if it is individualized for him. For example:

℞
Tetrycycline syrup, 90.0 cc.
(125 mg./5 cc.)
Syrup (simple), q.s. 120.0 cc.
Directions: 5.0 cc. q 6 h. q.i.d.

This type of prescription allows the mother to measure a whole teaspoonful of a preparation otherwise requiring that she measure ¾ teaspoonful. The inaccuracy of measurement of fractions of teaspoonfuls can be easily appreciated.

In any instance in which a drug is either U.S.P. or N.F., these letter designations need not be used on the prescription except for emphasis, e.g. Thyroid U.S.P. Since these standard books are revised every 5 years, one may still be writing "U.S.P." some 15 to 20 years after the drug became N.F. or was dropped from official status.

Incidentally, these official books are revised by physicians, pharmacists and others of technical interest, and all this is free of government or industry support. Ultimately the government accepts these standards for enforcement. The U.S.P. and N.F. have a minimal standard which all drugs must exceed. There are thus no standards in excess of U.S.P. and N.F. standards (despite the words of the misinformed "detail man").

MEASURES AND STANDARDS

Although the U.S.P. in 1890 adopted the metric system, it may never completely replace the archaic apothecaries' system, whose ghosts and ghost habits permeate our everyday life. The evil results of the old system, e.g. 4.0 cc. for the teaspoonful (the fluid drachm equivalent), the 0.6 cc. for vitamins (the 10 minims or drops), the 65-mg. tablets (1 grain), bottles of 30 ml. or multiple capacity (fluid ounce) and others, haunt us daily. If we who foster the surface area criterion must similarly wait for progress to come, we had better depend on the third or fourth generation of us to carry on.

Home Measures

LIQUID. *Spoons.* Fantus[5] relates that American teaspoons varied from 3.8 to 7.8 ml. and that the same spoon used by different persons varied from 3.0 to 7.0 ml. Five (5.0) ml. is now considered the average capacity of a teaspoon by definition[21] and by acceptance of most pharmaceutical houses. Attempts the better to standardize measuring spoons have been made with the following results:

TABLE 2. *Tolerance of Measuring Spoons*

SPOONS LEVEL FULL	CAPACITY OF SPOONS (CC.)	TOLERANCE (PLUS OR MINUS) FOR SPOONS	
		Cubic Centimeters	Per Cent
1 tablespoon	14.79	0.73	5
1 teaspoon	4.93	0.24	5
½ teaspoon	2.46	0.12	5
¼ teaspoon	1.23	0.06	5

Data from American Standards Association, Inc.: American Standards—Dimensions, Tolerance and Terminology of Home Cooking and Baking Utensils.

These measuring spoon sets cost only a few cents, and no doubt the druggist would carry them in stock if requested to do so.[2] Unless these spoons are used, fractions of teaspoonfuls introduce added error.

Little criticism has been made of the tablespoon, which of itself is too large for small children's mouths. Few children's doses are this large.

Droppers. Fortunately, in many homes, calibrated droppers (actually pipets) are available for measurement of 0.3 ml. and 0.6 ml. Without calibration, droppers should never be used for measurement except for true placebos. One drop may differ in size from another even from the same dropper, owing to a number of factors. Even the "official medicine" dropper delivers 50 to 60 drops per milliliter for some alcoholic liquids and 93 drops per milliliter for ether.[5] Some viscous or oily liquids are delivered with 7 to 8 drops per milliliter.

SOLIDS. The spoon cannot be used reliably to measure various powdered or granular substances unless each spoon is calibrated for each solid. This is an easy and welcome task for the pharmacist and may permit prescription of easily mixed and more reasonable bulk powder than the more expensive and difficultly powdered tablet. Smaller doses of powder can be weighed by the pharmacist and placed in folded papers. Such doses cannot otherwise be measured at home.

DIRECTIONS TO PARENT (OR PATIENT IF OLDER)

Directions preferably should be given by the physician, who should also write the prescription. The former, but not the latter, may well be left to a nurse.

Directions will be written on the label of the prescription. Others ought to be given orally as well as in writing so as to be read later

by the parent, thus assuring a greater chance of the medication being correctly used, as well as to save the time of the physician (who might otherwise be called later for directions).

Directions as to the temporal relation between drugs and feedings (meals) must be given. Distasteful drugs and foods ought not to be mixed outside the body for fear of making a food psychologically distasteful in the future because of past mixing with a noxious drug. Certainly drugs should not be put in the nursing bottle, since part of the contents may be rejected with the aliquot of active drug. Likewise the drug may collect on the bottle's sides and in the nipple and be lost, or the protein, phosphate or other content of milk may react with the drug and render it less active or absorbable. Rarely, one has to sacrifice the precaution and add drug to food as the only way of getting acceptance. With any children except small infants conversation about the mixing or the "guilty action" at the time of administration will often betray the act.

Drugs whose absorption is to be prolonged may be deliberately given with meals. If irritating, they may be given two to three hours after a meal. For rapid action, drugs may be given approximately 30 minutes before meals for fastest absorption. Vomiting in older children may be averted by giving a very hot or very cold drink at the time of the medicine. Infants will not take the hot, but will the cold, if previously conditioned to the cold. Carbonated beverages offer an additional property in the mildly anesthetic carbon dioxide they contain, which may prevent vomiting. Cracked ice and carbonated beverages may be given before and after medicine to prevent its loss in vomiting.

Although it is well to repeat vomited drugs if lost about 30 minutes after emesis, some drugs are absorbed in the stomach, e.g. aspirin, and may lean to toxicity, particularly with dehydration induced by repeated vomiting. Peculiarly, some antiemetics are absorbed through the stomach wall and thus have a chance of acting orally.

Directions for administration of drops into the mouth, nose, eyes and ears must be carefully given and repeated for some parents, although this is generally less necessary with reliable private patients who like to follow directions previously given and strengthened on subsequent similar visits. The child should be securely held, and the administering hand (holding the dropper) should rest on the head, thus functionally moving synchronously should the head move. If this precaution is not taken, the child may thrust his eye or other part into the stationary dropper. Drops given into the eye, nose or ear may be much more acceptable at body temperature than from a cold window sill or refrigerator. Warming is easily accomplished by carrying the dropper bottle in close contact with the parent's body 30 to 60 minutes before administration. If drops are to be warmed, the whole bottle probably ought not be warmed for many reasons (loss of drug strength or of the label). A large spoon holding more of the medicament than is to be used may be touched (underside) to hot water. The warmed drops should be tested by the one administering in his own nose, eye or wrist.

Oral drugs should not be given during a "tussle" with each administration, but some discipline may be necessary. Violent reaction with its full respiratory inspiration can result in a respiratory foreign body if solids or liquids are offered, though liquids are less dangerous. Holding a child's nose with drug administration is a dangerous but effective method of inducing inspiration and aspiration. If the finger and thumb are pressed on the sides of a baby's mouth, a spoon may be placed on his tongue, and light pressure towards the floor of the mouth while tilting the spoon to pour off its content may be all that is necessary. The baby or child has usually had experience with the familiar spoon. A much more successful administration certainly can be accomplished with the friendly spoon than with the "hospital" medicine glass. Student nurses often note this in the hospital, but often "education and tradition" bring them to the standard adult method of administration.

In many ways, children must be treated like psychiatric patients as far as drug administration goes. Liquid preparations are more certain of being swallowed. Solids may be held in the mouth, the water swallowed, and after the parent has gone, the drug removed, destroyed or stored. The child seldom takes a number of stored doses at one time as may the psychiatric patient bent on self-destruction.

STORAGE OF DRUGS

Because of the turnover of drugs as time progresses, it is difficult to know which drugs require special instructions about storage. The pharmacist often has special labels to indicate how long a preparation is active under refrigeration, or other "warnings" are also attached as to heat or light, although light may be cared for with dark bottles. Storage requirements usually come on the label, but so much label or insert may be present that the warnings are unnoticed. For example, smallpox vaccine cannot be injured by freezing and may retain potency for four years. At 10 to 50° F. (ordinary temperature of refrigeration) the potency remains for 3 to 4 months; at room temperature, one to 3 weeks, and the number of "takes" is reduced 50 per cent.[13] The label clearly reads, "Preferably below 0° C., and never above 5° C."[21]

DISPENSING OF MEDICATION BY PHYSICIANS

There would seem to be definite advantages to patients and to the physician to have small samples to give the patient as a trial before investment of a fair amount of cash for a large supply of drugs which might not be used. Many times, however, the samples are for items which cannot otherwise be got by the family without a prescription, so that a prescription needs to be given at the time of giving the sample. To treat a case with samples often requires that the patient walk out of the physician's office with two handfuls of tiny bottles. On the other hand, many times sufficient material is not available in sample form to treat even one case. The value of samples, therefore.

is many times questionable; in fact, they often become a nuisance. Almost every physician has established some kind of equilibrium as to what he takes and what he refuses, and what he gives away, throws away or turns over to a clinic or a pharmacy. Although it seems a shame to throw away many of these samples, it is often easier to meet the professional service representative (detail men) with open arms than to try to object. This is not meant to speak disparagingly of the detail men, who bring us a great deal of help and information.

Although every physician does some dispensing, as noted above, and many physicians give a small envelope of four or five tablets with each immunization, it is generally best to do as little dispensing as possible. This may not be feasible in a small community where no pharmacies exist. On the other hand, if there is any way possible to do so, a physician should not equip himself as a drug store. In addition to the tremendous investment of money in drugs which he often gives away or sells, and for which he may or may not collect, there is an even greater "sin." The physician's greatest contribution to his patient is his time. If he, on the other hand, spends his time or part of it in functioning as a pharmacist, he is at best then functioning at this level and not able to care for as many patients, or to care as well, as he might otherwise do. To allow other, untrained people to dispense medicines is of course wrong, also, for there is some danger in this. It must be remembered, in speaking of untrained people, that nurses must by definition fall into this category, since they do not receive training except as it involves giving of medications, and the background for this is in hospitals. Training in pharmacy is an entirely different discipline and should be regarded as such.

Many of the problems of whether to dispense or not to dispense are solved for the physician because of the expensive but effective specific medications that are available, namely, the antibiotics. The physician can hardly stock these and dispense them to his patient, although in some areas this must be done. Although it may be tempting to keep and dispense the cheaper medications and to sell these while prescribing the more expensive ones, this has many disadvantages also. It would seem wiser to suggest common ordinary remedies which can be bought without prescription to satisfy the ordinary needs, i.e. cough, pain, fever, and to prescribe all other medications. The value of the pharmacist can be tremendous, particularly of the more capable and interested ones as regards prescription service.

THE PHYSICIAN AND THE PHARMACIST AS A TEAM

It does not take the average physician long to recognize which pharmacist has special capabilities and in which direction these lie. Although many times one says disparaging things about the large drug store that serves many functions, if it can become large enough, it can be departmentalized to the point that the prescription room may be a very functional and valuable area and render a real service to the

physician, to his patients and to the community. There are certain things which help us to choose in addition to what the pharmacist says about his service and what we feel about him as a person. The most tangible pieces of evidence lie in the membership in societies, the kind of books and the date of his books, and the kind of journals he subscribes to. There are minimal standards of books which are required by most of the state Boards of Pharmacy. These may be found in every store. One would expect to find, of course, the U.S.P., N.F., New and Nonofficial Drugs, and perhaps several textbooks on pharmacy. A recent edition of a pharmacology text and a scientific pharmacy journal should be in evidence, as should the usual diplomas and state certificates. One would have some question about the pharmacist who did not belong to his scientific national society—The American Pharmaceutical Association.

The pharmacist can be a great supporter of the physician in rendering special services from time to time in addition to the usual things that are expected. He can often serve to screen patients from the harmful use of home remedies when they should be seeing a physician. On the other hand, one cannot become too critical of pharmacists who dispense remedies for such things as ivy poisoning, miliaria, and so on. The pharmacist who is steeped in his field will bring forth many suggestions for the busy practitioner so as to give a better kind of service and, of course, better preparations for the patient. Particularly with children, pharmacists may devise forms of medication, especially for new drugs which are not available on the general market.

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CHOOSING PENICILLINS FOR OFFICE, OUTPATIENT CLINIC AND HOME TREATMENT

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More than 70 individual drug firms[1] list penicillin and penicillin products for sale. Each of these houses prepares or distributes myriads of similar and different preparations intended for almost every route of administration. The forms may be swallowed, injected, applied to surfaces, inserted into cavities, and so on. There are some which effervesce in water or may be sucked like candy. The great number of preparations, forms and combinations speaks for the great use and high degree of reliability placed on this God-given "wonder drug," as well as an attempt commercially to share in this highly competitive field.

Ross[30] considered that "penicillin continues to reign as prince of antibiotics, with little likelihood that its position will be usurped in the near or distant future." This statement is certainly true in pediatric practice, especially in the outpatient clinic or in office practice.

The dictum of knowing, using and gaining experience with one or a few pharmaceutical agents certainly applies to penicillin. The response of penicillin-susceptible infections to penicillin is one of the greatest rewards in the practice of medicine. After nearly a fifth of a century of use, penicillin holds its lofty position deservedly. It is not the scope of this paper further to justify the use of this antibiotic over other chemotherapeutic agents. The reasons are many and familiar to the practitioner in the clinic, office or home.

Penicillin is not a perfect drug. We have no such drugs. Its great value is often clouded by the "detailed" publicity given to its side reactions, ineffectiveness, and so forth. Few companies advertise its virtues—except those related to their own patented preparation.

The dangers of inadequate and late therapy in remediable infections must be weighed against the side reactions, idiosyncrasies and other hazards of therapy. Fortunately, these dangers are not encountered as frequently in children as in adults.

By the time the average child is 10 years of age he has had a hundred illnesses.[10, 20] Respiratory infections account for most of these. Reference is made elsewhere in this volume and in other articles[5, 25, 26] to the available methods of diagnosis so that the choice of antibiotic can be based upon specific etiology. In many of the large pediatric centers the great flow of patients (usually of young age) through the "emergency rooms" and clinics has created situations requiring scheduled changes in house staff placement, teaching responsibilities, and the like. As pediatric teachers[18] recognize the changing scope of pediatrics it is likely that greater attention will be given to the common problems. The management of respiratory infections in children would certainly be one of these.

Rational antibiotic therapy needs to be based on adequate etiologic diagnosis. At present this is usually lacking in the office, home, outpatient clinic, or "emergency room" of the hospital. Until the diagnostic and teaching centers lead the way, loose talk and writing about "indiscriminate antibiotic" therapy are meaningless. An attempt is made[5] to summarize the helpful diagnostic aids which are generally available in office or outpatient clinics. The physician must carefully weigh many factors and choose to use or not to use penicillin or other antibiotic therapy. At the same time he should realize the limitations in the accuracy of diagnosis and the dangers of use as well as of failure to use penicillin or other antibiotic. These latter fears are more realistic to the physician who holds the syringe than to the one who holds the pen. The change of attitude which occurs in the physician whose situation is reversed would be amusing if it were not for the gravity of the problem. Mastoiditis, osteomyelitis and septic cavernous sinus thrombosis are relatively rare today. Nevertheless the possibilities of their occurrence must be weighed against the dangers of overuse of antibiotics. There is need for careful consideration in each particular case.

FACTORS INVOLVED

The initial therapy is most often ordered on clinical grounds alone. This paper deals only with the choice of penicillins. The consideration of diagnosis must always be the basis of choice of therapy. Once we decide to use penicillin, which of the many choices will we make in office, home and outpatient practice? Several basic factors can be considered in making this decision.

Severity of Process. Infections of great severity will usually be treated in the hospital, and in most instances the severity can be initially determined on clinical grounds. But since this is not always the case, rapidly acting penicillin is the choice. Occasionally it is wise to give penicillin before adequate studies are obtained, i.e. if it is a long distance from the hospital to the place where the severely ill patient is first seen. In most cases the practice of giving a "shot for the road" is to be condemned because the initial injection, before bacterial cultures are taken, may cloud the diagnosis and make the duration

of therapy unduly long or lead to dangerously premature discontinuation.

AGE OF PATIENT. The younger the patient, the less reliable is oral therapy. Refusal and "spitting" and vomiting may be frequent, so that initial therapy is best given parenterally.

PSYCHOLOGICAL TRAUMA. Little need be said about the all too well known "fear of the needle" and the desire to avoid injections. On the other hand, such fears should not preclude adequate and necessary parenteral therapy. As a cardinal rule, "the soma must be preserved as the psyche cannot exist alone."

COST OF MEDICATION, TRANSPORTATION, BABY SITTERS. These items cannot be forgotten. Although an injection may be less expensive in some cases than in others, the difficulty of getting the patient to the physician or vice versa must be considered. The problems are often compounded or the decision made easier if several family members are sick at the same time or within a short space of time.

DISTANCE OF PATIENT FROM PHYSICIAN. Only a few experiences are necessary to teach one the potential risk of giving oral therapy as initial therapy to a patient living far away. If after several hours (during which there has been no treatment) the initial oral dose is vomited, subsequent therapy must be by injection. This often requires a house call, which, of course, takes from the patient the most important thing a physician has to offer to his patient—*his time.*

PAST HISTORY OF PATIENT. It is fallacious to give an initial oral dose of penicillin to a child who by his own past behavior always, or frequently, vomits food, liquids or medication.

PREVIOUS SENSITIVITY. Patient sensitivity is much less a problem in the treatment of children[35] than it is in adults. Today, drugs are responsible for many reactions. Even more often they are blamed for conditions with which they have no association. Drugs have replaced syphilis and orange juice as the unjustly and justly accused cause of unusual states or reactions. Skin testing or other methods to determine patient sensitivity to penicillin are impractical and unreliable. If doubt exists, another antibacterial agent should be chosen. If, however, penicillin is given in spite of some doubt, long-acting preparations should certainly be avoided.

OTHER FACTORS. These include the unreliability of parents or nurse or the insecurity of parents.

RESPONSE TO PENICILLIN

In conversation with other practitioners I find that it is generally appreciated that if penicillin is effective, it is rapidly so. In these instances no other antibiotic gives this kind of response and allows the same ease of administration as that which is associated with penicillin. Failure of penicillin cannot be definitely determined for 24 to 48 hours or even longer, but in most instances response follows in several hours. The patient is improved or the progress of the disease is halted. Using the more slowly absorbed benzathine G penicil-

lin intramuscularly, Breese et al.[8] report return of temperature to normal in 58 to 73 per cent of patients within 24 hours and in 81 to 84 per cent by 48 hours. Similarly, rapid response follows various oral penicillins. Patients felt better within 24 hours and were practically well within 48 hours.[6]

One cannot accept dramatic response as evidence of the efficacy of penicillin in patients who are treated in uncontrolled office practice. A number of infections of unknown etiology may respond quickly even without antibiotic therapy. Parents often name these as the "24-hour virus" or the "48-hour virus."

FORMS OF PENICILLIN

Many valuable forms of penicillin are available which allow distinct patient and physician advantages. There are numerous preparations, permitting several routes of therapy.

Parenteral

1. Aqueous penicillin is seldom used except as initial therapy or in combination with other available parenteral varieties of penicillin for office or home treatment.

2. Procaine penicillin gives effective blood concentrations within one to three hours after administration.[30] Usually, the more rapidly attained level of aqueous penicillin is unnecessary, although it is certainly not undesirable. A combination of aqueous, procaine and benzathine G penicillin or a separate combination of the latter two types is available.[12] A single milliliter dose (300,000 units) of procaine penicillin will give 0.5 unit per milliliter at the end of 24 hours and bactericidal levels during the entire 24 hours or more.[13] An initial injection of procaine penicillin may be given to get infection under control. Subsequent treatment may then be continued with an oral preparation. This obviates the need, the inconvenience and the trauma of daily painful injections. When, however, parental or patient dependability makes continued oral therapy of questionable reliability, an initial injection of one of the combinations with benzathine penicillin may be safer. The small procaine content makes toxicity from procaine unlikely after procaine penicillin. Allergic or idiosyncratic reactions may be due to either procaine or penicillin.

3. Benzathine G Penicillin. Table 3 shows the cure rate in streptococcal infections following one injection of 600,000 units of benzathine G penicillin or of 10 days' oral treatment. Thus a high order of efficiency is reported for all forms and routes in the treatment of streptococcal infections in a total of 611 children.

The advantages of injectable benzathine G penicillin over oral therapy in this study were as follows:

(*a*) The great therapeutic effect along with its effective prevention of multiple streptococcal infections during this study made it appear that this is the drug of choice.

TABLE 3. *Penicillin Preparations, Dosage and Cure Rate in the Treatment of Streptococcal Infections in Children*

FORM OF PENICILLIN	UNITS PER DOSE	TOTAL DOSE UNITS	% CURE	STANDARD ERROR	NUMBER TREATED
Benzathine penicillin G (IM)	600,000	600,000	92.6	±2.35	122
Oral:					
Benzathine penicillin G (tablets)	200,000	8,000,000	85.0	±3.35	115
Penicillin V	200,000	8,000,000	88.8	±2.85	122
Potassium penicillin G (buffered)	200,000	8,000,000	87.4	±3.1	114
Penicillin G (buffered) and Probenecid tablets	250,000 plus 0.25 gm. of Probenecid	7,500,000	81.9	±2.85	66
Potassium penicillin G and Probenecid suspension	250,000 plus 0.5 gm. of Probenecid	5,000,000	90.1	±3.5	72

Condensed from B. B. Breese and F. A. Disney.[6]

(*b*) A feeling of security is attained, since one knows that the full dose was administered and absorbed.

(*c*) The cost of medication is below that of oral preparations.

The disadvantages were those usually related to parenteral medication in children. Benzathine G penicillin is painful, with pain (42.4 per cent) and limp (35.4 per cent).[8] These results conform to previous clinical impressions. Although procaine penicillin when added[8] did not improve the therapeutic or prophylactic effectiveness of the combination, clinical impression would make this combination the choice parenteral penicillin preparation because of the reduction of limp and pain. Its permanency is also an asset since it comes already mixed. Although this is true for home calls particularly, the preparation containing aqueous penicillin in addition may be easily mixed and remain potent if used in an office or clinic where penicillin is frequently injected. A single injection seems an adequate course in the treatment of streptococcal infection.[13] The greatest care must be taken to inject these preparations into the upper outer quadrant of the buttocks in order to prevent bleeding from large vessels or nerve damage (often permanent).

(*d*) *Other Repository Penicillins.* There remains little or no need for use of aluminum monostearate, beeswax or other agents to be used for delaying penicillin absorption.

Oral Forms of Penicillin

1. Penicillin G. Many clinicians have held steadfast to this salt of penicillin for oral use. Studies by Breese and Disney[6] found buffered penicillin G to be an effective agent in treating the highly sensitive streptococcal infections of children. It should be given 30 minutes before meals (empty stomach). Maximum blood levels are reached in 30 to 60 minutes.[30] Approximately one fourth of the oral dose is absorbed; the dose, as compared to the parenteral dose, should be accordingly increased. When cost is a consideration, this penicillin is the least expensive of oral penicillins. Its taste may be objectionable. In outpatients it is seldom necessary to delay the renal excretion with Probenecid. Indeed, this may complicate therapy by skin rash.[6] Sulfonamides may be given in combination with the several oral forms of penicillin and may enhance their therapeutic value. They do not act to alter the rate of renal elimination of penicillin.[8]

2. Benzathine G Penicillin. Unlike its injectable counterpart, the oral form must be given with the usual regularity (every six to eight hours). In tablet form this represents the choice oral preparation from the point of view of taste.[6] In suspension or drops it is likewise well accepted.

3. Phenoxymethyl Penicillin (V). Early studies[27, 31, 37] and subsequent ones[23, 36] revealed respectively excellent blood levels and clinical effectiveness against sensitive organisms when this penicillin salt is given orally. Clinical success has been gratifying with oral use of this drug in the treatment of streptococcal infections. Because of

the sensitivity of the streptococcus, high levels in the blood may not be necessary,[6] but can be reached orally with this V salt to permit oral treatment of bacterial endocarditis, osteomyelitis and other severe infections. This experience has been, and should be, limited to hospital practice with close observation and study. Cost may be a deciding factor in considering this and the next form of penicillin. The spectrum of penicillin G, V and the newer "synthetic" penicillins are essentially the same.[21] The value of dimethoxyphenyl penicillin (Staphcillin) against clinical staphylococcal infections will be keenly anticipated.

4. Potassium Alpha-Phenoxymethyl Penicillin ("Synthetic"). After initial preparation of a precursor (G-aminopenicillanic acid) by a fermentation process, this penicillin is then made by synthetic acetylation. The acid stability is equivalent to that of penicillin V at pH 2 and pH 3 at 37 to 38° C.[22] Although great claims are made for higher blood levels and even wider spectrum than with penicillin V, at this point it seems reasonable to accept it as equal to penicillin V and superior to penicillin G in resistance to acid degradation.[21] No other significant advantage for the new preparation has yet been established.[21] Like penicillin V, its cost may be a consideration in its use.

Oral penicillins (like other chemicals and other antibiotics) are often ordered in milligrams rather than units. General usage and custom make it difficult to bring parenteral penicillin to this more reasonable standard of weight. The following is offered for ease of conversion.[28]

Sodium penicillin G	1667 units per milligram
Potassium penicillin G	1595 units per milligram
Procaine penicillin G	1009 units per milligram
Benzathine penicillin G	1211 units per milligram
Phenoxymethyl penicillin (V)	1695 units per milligram
Potassium phenoxymethyl penicillin (V)	1530 units per milligram

Using a "round number" (1400 units equal 1 mg.) should make conversion to milligrams easier for eventual uniformity of dosage; or units (in thousands) times 0.7 equals milligrams.

Choice of Oral Penicillin

Considering the previously noted limitations and advantages of oral penicillin, there are certain cautions and considerations deserving of comment. The nursery school, preschool and kindergarten children who do so poorly with oral solid therapy are the very ones who have recurrent respiratory disease. One can place greater reliability in oral liquid preparations, i.e. syrups, suspensions, and the like, than in tablets. These, if used, should be swallowed whole. Candy preparations may not be efficiently absorbed into the systemic circulation. Candy is best bought at the candy counter, not at the prescription counter. The troche or the lozenge produces no significant clinical effect except the adverse one of sensitization.

Fractions of teaspoonfuls are difficult to measure. Diluting stock preparations with syrup, water or the like to an appropriate volume

allows measurement of a full teaspoon for greater accuracy of measurement. (See also page 47.)

Drop doses must not be put into the baby's bottle, since part of the formula is often refused during illness. Also, the compatibility of each preparation must be known. Loss by adherence to the bottle or nipple must be considered.

Expense (see below) is a factor of increasing importance proportional to family size and concurrent infection in siblings or parents.

Stable preparations are preferred to those which deteriorate after 7 to 10 days. Should it be necessary to stop therapy after a few doses, the preparation can be held until the next need arises with a saving (often about 5 dollars) to the parents or grandparents. The latter age group seldom understands present drug prices.

Topical Forms

Topical forms of all antibiotics commonly used for systemic therapy are discouraged. Nevertheless local penicillin can reasonably be applied if systemic penicillin is being used concomitantly. Numerous topical forms are available.

DOSAGE OF PENICILLINS

The dosages of the various forms of penicillin when used in the treatment of active infection are given in Table 4.

TABLE 4. *Dosages of Penicillin in Treatment of Active Infection*

	ORAL	INTRAMUSCULAR
Penicillin G	100,000–300,000 U 5 times daily 30 minutes before meals	20,000 U/kg. or 100,000–300,000 U/day (procaine salt)
Benzathine penicillin G	100,000–300,000 U q.i.d.	0.6–1.2 million U/dose
Penicillin V	100,000–300,000 U q.i.d.	
"Synthetic" penicillin	125–250 mg. t.i.d.	

DURATION OF THERAPY

The criteria for ideal length of therapy for streptococcal infections are well delineated. Ten days of treatment results in a favorable effect on the illness, prevents complications, and eradicates the organism from the nasopharynx.[14, 32] With penicillin-susceptible organisms[6] response is usually rapid, i.e. 24 hours, 48 hours with return of normal temperature, and nearly all the children well in 5 days.[23] It is often difficult to get parents' cooperation after this point if all is going well. The prescriptions are often not refilled. The cost of medication may be a deciding factor. Intramuscular benzathine G penicillin acts long beyond five days. Many physicians commonly treat for one week to 10 days, either at home or for hospitalized patients, e.g. pneumonia.

COST OF TREATMENT

Since the greater frequency of infectious diseases falls in the toddler class, the retail cost of treating an infection for 10 days is given on the basis of using liquid (suspension) preparations in prescribed dosage. Other antibiotics are listed for comparison (see Table 5).

TABLE 5. *Antibiotics and Cost of Treatment to Family (15-Kg. Child) for 10 Days (Liquid Preparations)*

DRUG	DOSE AND FREQUENCY	DOSE	COST TO PATIENT
Penicillin G	200,000 U q.i.d.	8 million units	$ 6.66
Penicillin V or V-K			
(33 mg./kg./day)	200,000 U q.i.d.	8 million units (5.0 gm.)	$12.50
(16.5 mg./kg./day)	100,000 U q.i.d.	4 million units (2.5 gm.)	$ 6.25
"Synthetic" penicillin	125 mg. q.i.d.	5.0 gm.	$13.33
	62.5 mg. q.i.d.	2.5 gm.	$ 6.66
Tetracycline			
(33 mg./kg./day)	125 mg. q.i.d.	5.0 gm.	$14.02
Declomycin			
(20 mg./kg./day)	150 mg. b.i.d.	2.9 gm.	$14.13
Chloramphenicol			
(100 mg./kg./day)	375 mg. q.i.d.	15.0 gm.	$34.00
(50 mg./kg./day)	188 mg. q.i.d.	7.5 gm.	$17.00
Propionyl erythromycin (18 mg./kg./day or 1/3 erythromycin dose[17])	70 mg. q.i.d.	2.7 gm.	$ 7.25

Table 6 lists the costs of drugs used for the prevention of streptococcal infection.

TABLE 6. *Summary of Drug Costs to Family for Prevention of Streptococcal Infection*

MEDICATION	QUANTITY FOR 30 DAYS	APPROXIMATE COST
Benzathine G penicillin	1,200,000 U (IM)	$2.50 (to physician)
Penicillin G	Sixty 200,000-U tablets	$3.50–$9.00
Penicillin V	Sixty 200,000-U tablets	$15.00–$18.00
Sulfadiazine	Sixty 0.5-gm. tablets	$3.00–$4.00

From the Medical Letter on Drugs and Therapeutics.[21]

Since prophylactic therapy against rheumatic fever may be for a lifetime, consultation with the proper pharmacist may save the family a large sum of money. It may be noted that the most expensive form of therapy is equivalent to the cost of about three bottles (fifths) of whiskey.

PROPHYLACTIC PENICILLIN

Detailed consideration of prophylaxis against the streptococcus is beyond the scope of this paper. Reference instead is made to a number

of papers[2, 7, 9, 11, 14–16, 19, 32–4] on streptococcal prophylaxis, and prophylaxis against the sequelae of streptococcal infection and against other common pediatric respiratory problems by use of penicillin and other chemotherapeutic agents.

Penicillin is the choice agent in the treatment of streptococcal disease and, thus, the sequelae. It is also the choice agent for prevention of streptococcal infection in patients who have had rheumatic fever, recurrent anaphylactoid purpura and other problems associated with recurrent streptococcal infections. The dosage and duration of treatment for active therapy of streptococcal infections have been discussed above. These recommendations and those for prophylaxis of the latter problems are fairly clear, although questions about the usual recommendations[2] have been raised by Lim and Wilson.[19] Other uses and doses are far less clear. The continued "prophylactic" use of penicillin or other antibiotics daily in the toddler whose "nose runs all winter" and in the patient who continuously receives steroid[11] is generally an expensive and probably dangerous "luxury."

Rheumatic Fever Prophylaxis (in Absence of Infection)

It is of signal importance to give penicillin prophylactically to one who is known to have had rheumatic fever in the past, since the recurrence rate may be 10 to 20 times greater after infection with group A streptococci following a previous attack. The all too commonplace diagnosis of rheumatic fever in the home or office on clinical grounds alone is to be deplored. This is a diagnosis of maximal importance with long-term and expensive follow-up. Even with the best of laboratory aids, diagnosis is often difficult.

> Rheumatic fever is a recurrent disease which in most instances can be prevented. Since both the initial and recurrent attacks of the disease are precipitated by infections with beta hemolytic streptococci, prevention of rheumatic fever and rheumatic heart disease depends upon the control of streptococcal infections. This may be accomplished by (1) early and adequate treatment of streptococcal infections in *all* individuals and (2) prevention of streptococcal infections in *rheumatic* subjects.[2]

The American Heart Association recommends that "all individuals who have had a well established history of a previous attack of rheumatic fever or chorea or who show *definite* evidence of rheumatic heart disease should be placed on continuous prophylaxis throughout life, or until new knowledge makes this recommendation invalid."[2] This includes all days of the year (summer, too).

Their recommendations for penicillin are as follows: "Oral: This depends on patient cooperation" with long-acting depot penicillin intramuscularly for those who do not cooperate.

> Dosage—200,000 to 250,000 units once a day before breakfast.[2]
> (125 mg. of penicillin V = 200,000 units)
> Intramuscular Benzathine Penicillin G
> Dosage—1,200,000 units once a month.[2]

Kaplan's[15] study supports the once daily dose; Hodes[14] suggests it twice daily. Other penicillins[6] are also effective.

Erythromycins, sulfonamides or tetracyclines may be used if penicillin cannot be used, but with less reliability.[24] Children with rheumatic or congenital heart disease should be protected against the dangers of bacteremia by giving adequate doses of appropriate penicillin before dental extraction, tonsillectomy or bowel surgery. Preparation for surgery may originate from an antibiotic point of view outside the hospital. Antibiotics given in situations with less specificity of organism, i.e. not against a single organism such as for patients with nephrosis or diabetes, are not often successful and may be associated with the entry of nonsusceptible organisms which are difficult to treat. Since these patients may often return to a hospital, the physician not only adds to the risk of drug toxicity, but also appreciably increases the risk of drug-resistant organisms.[4]

Lim and Wilson[19] have studied the recurrence rate of rheumatic carditis in children treated with adequate doses of penicillin only at the onset of respiratory illness. The results of their six-year study were compared to the more generally accepted method of daily oral prophylactic doses. Of cardinal importance in the study is the close observation and careful follow-up which may be much more possible for the private physician than in hospital clinic practice. They state: "There was no significant difference in the recurrence rate of active carditis among patients receiving continuous therapy during respiratory illness when the interval since the last attack was considered."

The recommendations for penicillin and dosage at this time should follow those of the American Heart Association[2] until the findings of Lim and Wilson are confirmed by others. The conditions of their study are more like those of private practice and deserve careful consideration in cooperative patients and families.

Contacts of Streptococcal Patients

Hodes[14] recommends 200,000 units (125 mg.) of phenoxymethyl penicillin twice daily for family exposures to beta hemolytic streptococcal exposure, but Breese and Disney[7] concluded from their study that prophylaxis for siblings was of no value in preventing infection, and it is therefore not recommended. Reference to their paper is given for these reasonable conclusions. Contacts of patients, on the other hand, should be observed closely and treated with full penicillin dosage for infections found. Contacts of scarlet fever may be considered in this light.

COMBINED CHEMOTHERAPY

Years of concomitant, but separately administered, use of penicillin and sulfonamides have endeared this combination to the heart of many clinicians. This is true of the fixed proportion combination of penicillin, and of streptomycin to a less extent. Yet this latter combination with long-acting penicillin and a single dose of short-acting strepto-

mycin seems irrational. In either instance of combined fixed proportioned therapy, the choice of penicillin and its dose is governed and limited by the sulfonamide or the streptomycin as the case may be. Fortunately, sulfonamide may be administered separately (orally) with the correct dose chosen, and thus the dosage and form of penicillin may be chosen as circumstances alone indicate. All the penicillin-streptomycin combinations give a great and dangerous excess of streptomycin for infants if the dosage is calibrated by the penicillin content and especially if the common "1 cc." or "1 ampule" is ordered. Although the hunter learns that it is infinitely easier to hit the target with a shotgun blast than to depend upon the precision and accuracy of a rifle bullet, the side reactions of each antibiotic and the price of "shotgun" therapy generally make this therapy dangerous and expensive, and often cause the duration of therapy to be dangerously shortened. Combinations of penicillin and other chemotherapeutic agents in fixed proportion are not recommended.

GENERIC AND TRADE NAME PREPARATIONS

The multiplicity of names, combinations and companies makes this a confusing business with little possibility of future simplicity, indeed with the probability of greater complexity. Most common trade names are listed and available to physicians;[29] there are even more listed elsewhere.[1]

SUMMARY

Penicillin remains, in general, the best antibiotic available. This is true in pediatric practice, particularly in the office and in outpatient clinics. Many excellent preparations are available, and there are numerous factors to be considered when making a choice. These factors, the various preparations, their dosages and uses have been discussed.

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OFFICE USE OF GAMMA GLOBULIN

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Gamma globulin is that fraction of the human serum proteins which contains antibodies produced by the host organism against specific diseases or antigens. These antibodies are formed in the lymphoid tissue in response to certain diseases and remain in the circulating gamma globulin for varying times, sometimes for life. This fact has clinical implications in that there are diseases in which these antibodies may be transferred to another person. Such a person then has a passive immunity of more or less degree. A solution of gamma globulin is available commercially as "immune serum globulin," or "poliomyelitis immune globulin, human" which has been prepared from pooled human plasma. It has been extracted and concentrated to contain 165 mg. plus or minus 15 mg. of gamma globulin per cubic centimeter. It is administered by intramuscular injection, never intravenously, and is usually effective for approximately four weeks after injection. Generalized reactions or sensitization is extremely rare, although some local tenderness or muscle stiffness may be present for several hours after injection. The cost is approximately 2 dollars per cubic centimeter, although many local health departments have it available at no cost to the patient when it is used in certain epidemic situations or when the patient is indigent. This practice will vary in different communities.

Gamma globulin is used clinically for the treatment of disease and for its prevention or modification. The most important use for treatment is in the child with agammaglobulinemia or hypogammaglobulinemia. Agammaglobulinemia was first described by Bruton in 1952. He reported upon its use in a boy who had repeated attacks of sepsis. The boy had no circulating gamma globulin. Since then there have been numerous other cases reported of patients who had an absence or deficiency of effective gamma globulin. The usual recommended dose in these cases is 0.6 to 1.0 cc. per kilogram of body weight administered every 4 weeks.

SMALLPOX VACCINATION COMPLICATIONS AND VACCINIA

Smallpox vaccination complications are due to inability of the patient to form antivaccinial antibodies or to a slow development of these antibodies. They can be treated with hyperimmune vaccinial gamma globulin. Chapters of the American Red Cross may be contacted for this product.

These complications include generalized vaccinia, vaccinia gangrenosa and eczema vaccinatum. The recommended dose of gamma globulin is 0.6 cc. per kilogram of body weight, intramuscularly. This may have to be repeated, depending upon the response, particularly in vaccinia gangrenosa. The same dose may be given to a child with eczema who has been in contact with a person who has an active smallpox vaccination. Similarly, it can be given to the eczematous child in whom vaccination is mandatory.

PROPHYLAXIS

The second main use of gamma globulin is in the prevention or modification of disease. The rationale for its use in these situations is based upon the assumption that enough antibodies to give passive immunity are thereby provided for a limited time. The effectiveness of this immunity will depend upon both the amount of specific antibody present in the gamma globulin administered and the time of administration in relation to the time of exposure. The preparation "poliomyelitis immune globulin" has been tested for the poliomyelitis antibody content in accordance with United States Public Health Service specifications. This is the only antibody content that is routinely determined. It is assumed, however, that, the serums being pooled, the antibody content against other diseases is also adequate when given in recommended dosages. For such conditions as rubeola, infectious hepatitis, poliomyelitis and rubella this pooled human immune globulin is used. For pertussis and mumps a specific hyperimmune globulin is used. This hyperimmunized globulin has been obtained from donors hyperimmunized against the disease for which the preparation is being given.

Measles (Rubeola)

In order to prevent or modify the disease the gamma globulin should be administered within the first six days after exposure. Some effect may be expected if it is not given until as much as 10 days after exposure. In this case, however, the dosage should be increased. Optimal time for administration for modification is probably about five days after exposure. This will ensure, as much as it is possible, that the patient will have measles, although a milder form, and therefore develop permanent immunity. The clinical manifestations of measles modified in this manner are usually much less severe, and the complications of encephalitis and pneumonia are extremely rare.

For these reasons an attempt should be made to modify the disease in all children.

It is not wise to attempt to prevent measles from developing completely except in a child whose health might be impaired, even with a modified form. Such children will probably be exposed again later, without benefit of gamma globulin, and have the disease in its usual unmodified form. There will be many cases in which the presence of a true exposure is in doubt. They should be judged individually, and when there is a reasonable suspicion of exposure, gamma globulin should be given. There will be many requests for a "shot" during an epidemic because "there are a lot of cases around." Except in selected cases this should not be done, because the protection is only temporary. The usual recommended dose is 0.1 cc. per pound of body weight for prevention and 0.02 cc. per pound of body weight for modification.

Poliomyelitis

With the advent of a vaccine to produce an artificially acquired active immunity against poliomyelitis the need for conferring passive immunity through the use of gamma globulin has largely disappeared. It appears, however, that a dose of gamma globulin of 0.14 cc. per pound of body weight is effective in preventing or lessening the paralysis produced by the disease. It should probably be administered to household contacts who have not been actively immunized. For other contacts the recommendations of the state or local health departments should be followed, since the selection of persons to receive gamma globulin will depend upon the characteristics of the particular outbreak and in many instances on the availability of gamma globulin.

Pertussis

An infant who has not been actively immunized against pertussis should, upon exposure to pertussis, receive passive immunity through the use of gamma globulin prepared from hyperimmune serum. It is prepared from plasma from donors previously hyperimmunized with phase I pertussis vaccine. This is available as Hypertussis (Cutter) and should be given in the dosage of 1.25 cc. and repeated in one week if the exposure continues. The preparation may also be used therapeutically in a dose of 1.25 cc. repeated in 24 to 48 hours. If given early in the disease, it will apparently decrease the severity of the paroxysms of coughing, shorten the duration of fever and decrease the total duration of disease. The cost is approximately 10 dollars for a 1.25-cc. dose.

German Measles (Rubella)

Prophylactic measures are never indicated for the modification of rubella and are rarely indicated for prevention except perhaps for the exposure of a susceptible person during the first trimester of pregnancy.

If used, the gamma globulin should be given as soon after exposure as possible, 0.1 cc. per pound of body weight. *Results are contradictory.* Some investigators report a high degree of effectiveness, and others report almost complete ineffectiveness. This may depend upon variations in different batches of gamma globulin or upon differences in the strain of virus.

Infectious Hepatitis

In infectious hepatitis, type A, gamma globulin is effective in modifying the disease to a subclinical level, although it will apparently not prevent infection of a susceptible person. Such persons will harbor the virus. It should be administered as soon after exposure as possible, although it will be at least partially effective if given as late as a week before the expected onset of symptoms. Dosage is 0.02 cc. per pound of body weight. The most effective use is in institutional outbreaks and in the Armed Forces, although administration to close contacts and family members of an individual case is usually advisable.

Mumps

There is a solution of gamma globulin available which is prepared from professional donors hyperimmunized against mumps with mumps vaccine. It is prepared under the name Hyparotin (Cutter). For an exposed child the suggested dose is 1.5 cc. intramuscularly; for children over 12 years and for adults the suggested dose is 2.0 to 4.5 cc. The need for prevention of mumps in a prepuberal child, particularly boys, should be carefully evaluated because of the desirability of conferring permanent immunity to mumps before puberty. The incidence of orchitis in children is rare, but rises rapidly after the age of puberty. This preparation is of little value after the onset of symptoms, although it may prevent the occurrence of orchitis even when given after the appearance of parotitis if given in amounts which are at least five times the usual dose. The cost of this preparation is about 10 dollars per 1.5 cc.

EMPIRIC USE

Frequently children are seen who have "one infection after another." Empirically it would seem that even though these children do not have a true gamma globulin deficiency, they might benefit by administration of additional gamma globulin. Before any spectacular results are attributed to such administration it must be remembered that frequently children will have a bad "season," particularly when first starting to school, only to be followed by a winter relatively free from infection. Under such conditions gamma globulin should be judiciously used and with the knowledge of its limitations. If used at all, it should be given in large enough dosage—probably at least 0.1 cc. per pound of body weight.

PREMATURE INFANT

The level of gamma globulin in a premature infant is significantly lower than in either the mother or a full-term infant. A physiologic decrease is noted by the end of the third month until the infant begins forming his own gamma globulin. Thus it would seem well to administer gamma globulin to a premature infant both at birth and before discharge from the hospital as a prophylactic measure. A dose of 1.0 cc. should be sufficient.

SUMMARY

Gamma globulin is used clinically for the treatment of disease and for its prevention. It is used for treatment of agammaglobulinemia and hypogammaglobulinemia and for smallpox vaccination complications and vaccinia. It may be used for prophylaxis in rubeola, infectious hepatitis, poliomyelitis, pertussis, mumps and rubella.

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FEVER CONTROL IN THE OFFICE AND THE HOME

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Probably the most frequent "chief complaint" heard in reference to a sick child, either in the office or by telephone, often late at night, is that of "fever." Frequently the degree of elevation, regardless of the cause, is a basis for real concern, even if only to the mother. This paper will attempt to deal with the treatment of the symptom of fever independently of the etiology. Obviously the cause for the fever should always be investigated and appropriate treatment instituted.

PHYSICAL MEASURES

There are certain procedures that may be used to help lower a high fever either in conjunction with specific drugs or at times when drugs are unavailable. Such measures are simple enough to be done by anyone. The easiest and most effective is sponging off the child with water. It is important to instruct the parent in the proper method of sponging so that maximum benefit can be obtained and so that chilling will not be produced. Tepid water should be used. For an older child it is usually most effective to have him in the bathtub, where the water can actually be splashed or poured on the skin. The effectiveness of sponging is dependent upon both conduction of heat from the body to the water and, more important, evaporation. This is *not* accomplished by the use of a moist cloth, which many parents are prone to use. Ice water is often used. This, however, will produce chilling and a peripheral vasoconstriction and will tend to conserve body heat. Alcohol may also be added to the water to increase evaporation. If the patient is hospitalized, ice bags may be used in conjunction with a drug to decrease shivering. Thorazine is such a drug. A cool enema is often beneficial. The parent should be instructed as to the

temperature of the water—cool, not cold—amount to be used and amount of force to use.

Maintainance of adequate hydration is important, particularly if the fever is present for several days or more. If adequate oral intake is impossible, retention enemas can be used. A solution roughly equivalent to 5 per cent glucose in saline may be prepared by the addition of one teaspoonful of table salt and 2 tablespoonfuls of corn syrup to 1 pint of water. If these methods are unsuccessful, intravenous fluids may be needed to replace the increased loss of water and salt which is occurring through evaporation.

Bed rest is important in an effort to keep body metabolism at a minimum. Circulating fans or air conditioning may be used in hot weather to hasten evaporation of perspiration.

MEDICATIONS

Acetylsalicylic acid (aspirin) is still probably the best and most readily available medication for lowering fever. The usual dose is 1 grain of aspirin for every year of age to age 5 years, administered every 4 hours as necessary. Five grains are usually sufficient for the child 5 to 10 years, and 5 to 10 grains for the child over 10 years. The use of aspirin should be avoided in the infant under one year of age because of an occasional idiosyncrasy to the drug at this age. Prolonged use should also be avoided because of the possible accumulation in the body with resultant toxic symptoms. A decrease in prothrombin level may also be produced after prolonged use, and bleeding may ensue.

A useful drug for use in children of any age, but particularly in young infants, is acetaminophen. This is available in both drop form and syrup form as Tempra (Mead, Johnson) and Tylenol (McNeill). Both preparations contain 60 mg. per 0.6 cc. of drops and 120 mg. per teaspoonful of syrup. The dose is approximately 30 to 60 mg. per year of age and may be repeated every 3 or 4 hours. The onset of action is frequently more rapid than that of aspirin, but the total duration of effect may not be as long. Consequently the dose may have to be repeated every three hours. Toxic effects are minimal, and there is little accumulation in the body.

Another highly effective drug with rapid onset of action is Pyralgin (Savage). This is described as a "distant chemical relative" of aminopyrine and has the chemical name of sodium-1-phenyl-2, 3-demethyl-4-methyl-aminopyrazolon-N-methane sulfonate. In contrast to aminopyrine, no cases of agranulocytosis have been reported with the use of this drug. It is available in tablet, liquid, drop and injectable form. The dose varies from 0.25 to 0.5 gm. and may be repeated in 2 hours if necessary. Lowering of the temperature is often noted within 20 to 30 minutes after an oral dose.

Sedation is often helpful for the sick child who is overactive. In addition to the commonly used sedative drugs, some of the antihistamines may also have a sedative effect. Thorazine may be used both for its sedative effect as well as its antiemetic effect.

TEMPERATURE TAKING

Finally, a word as to the actual taking of the temperature. Parents should be encouraged to take the temperature rectally in children under five years. Although it is usually recommended that the thermometer be left in for at least three minutes, a reading very near the maximum obtainable can be obtained after only one minute. The thermometer can be inserted easily, even without lubricants, by gently spreading the buttocks apart, aiming toward the umbilicus.

In most instances it is not necessary for the parent to take the temperature every four hours. Once or twice at the beginning of the illness to confirm the presence of fever and again toward the end of the illness to ensure recovery is usually enough. The physician can instruct the parent when to take the temperature according to the natural history of the diagnosed illness. The parent should also be informed as to the expected duration and elevation of the fever for the particular illness. This will certainly avoid needless concern and worry and will avoid many telephone calls when the patient still has fever on the third day of measles.

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SUDDEN DEATH IN INFANTS

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The sudden unexpected death of an infant is a tragedy that will probably be experienced at least once by every physician who has anything to do with the care of children. It is by no means a rare occurrence, and the impact of such an event, on both the family and the attending physician, is indeed shocking. For the purposes of this discussion, sudden death in infants may be defined as sudden, unexpected death in an apparently well child or in a child with an illness so mild and of such short duration that it would not ordinarily be expected to terminate fatally.

In the past 20 years more and more attention has been focused on this problem. As the body of evidence mounts, backed by the careful investigations and studies of many able pathologists, one basic fact emerges clearly—that there is no single cause. Indeed, the causes of sudden death are almost as diverse as the entire field of medicine. In addition, it has been brought out that there is no single symptom or set of symptoms which would enable one to anticipate or prognosticate a fatal outcome in any individual case.

DUTIES OF THE ATTENDING PHYSICIAN

When a physician is called and notified of the sudden, unexpected death of a child, his response should be prompt and immediate. A visit to the home is mandatory and should take precedence over anything else he is doing at the moment, even though his waiting room may be full of patients. Once at the home, his first duty is to verify the fact that death has occurred; at the same time a careful examination of the environment should be unobtrusively performed, noting such things as the position of the body, distribution of the bed clothes and presence or absence of vomitus and blood around the nose and mouth.

The guilt feelings of families involved in such a tragedy are overwhelming, and it is the obligation of every conscientious physician to do everything in his power to assuage and comfort these people and

to relieve these feelings. There is no better time than this to point out to the family that the majority of deaths of this kind are due to natural causes, but that the only way to find out definitely is to have an autopsy performed. The laws of various communities differ greatly concerning mandatory autopsies in cases of sudden death and even as to who may perform such autopsies. In some areas autopsy is required; in others it is not, or is left to the discretion of the coroner or medical examiner. It would be well for every physician to familiarize himself with the regulations covering this situation in his own community. Nevertheless *even an autopsy does not always explain the cause of death.*

A careful history of the events immediately preceding death should be obtained, but questions to the parents must not be challenging or threatening in tone or content. An explanation to the family as to why these questions are necessary is in order. It should be explained that any additional help which can be given the pathologist by virtue of the history, if any, may aid him in establishing the cause of death and may direct his attention to any special investigations which may be necessary to make a diagnosis. Specific questions should be asked and should be phrased in such a way as to bring out the presence or absence of what, to the parents, may have appeared to be trivial symptoms. The following is a partial list of some questions which might be asked:

Did the infant show any signs of a cold, runny nose, or cough?
Did he seem to have any fever?
Did he eat as well as usual?
Any diarrhea, constipation or other change from his usual bowel habits?
Any vomiting?
Any unusual irritability or listlessness?
Has anyone in the family had any sort of respiratory illness in the past 24 to 48 hours?

This after-the-fact history-taking need be limited only by the skill and tact of the historian and the willingness of the family to answer questions.

The coroner or medical examiner should then be notified. If a postmortem examination is to be done and if permission to move the body is obtained from the proper authorities, the physician can be of still further service to the family by making arrangements for transportation of the body to the place of examination. It would not be amiss for the physician to make a visit of condolence to the funeral home or the house, a small gesture, indeed, but one for which the family will be grateful. If one cannot bring himself to do this, a card of sympathy or some other small token of thoughtfulness is in order.

After the autopsy the findings of the examination should be conveyed to the family in simple, easily understood language—orally by the attending physician, and in writing by the pathologist who does the examination. Most local physicians who have undergone this experience one or more times expressed the opinion that the bereaved families were extremely grateful for their promptness, sympathy and support and had continued to use their services for other children in

the family. The only exceptions to this, strangely enough, were in those instances when death occurred during or shortly after elective surgery, even though the attending physician himself did not perform the operation, but merely advised it.

It is obvious, of course, that any autopsy in cases of this kind should be performed by a competent and interested pathologist, preferably one well versed in the pathology of infants and children. The examination should consist of careful gross and microscopic examination of all tissues and organs, together with bacterial cultures from the heart, throat, spinal fluid, lung and intestinal contents. In addition, viral studies of various tissues and body fluids should be done and a portion of each specimen preserved in the deep-freeze for possible viral studies at a later date, after the histologic sections have been seen. Postmortem blood, spinal fluid, brain, lung, heart, liver and feces should be collected. In this way, with improvements in techniques of viral culture and identification, some unexplained cases of sudden death may be clarified.[10]

AGE, RACE, SEX AND SEASONAL INCIDENCE

Statistics show that by far the highest incidence of deaths occurs in the group of infants six months of age or less, with a peak incidence at age two months. In Adelson's[3] series of 126 cases 85 per cent of the children were less than 6 months old. He even goes so far as to state that "once a child has reached the age of 7 months, the likelihood of sudden and unexpected death is greatly reduced." In general, these figures coincide with those reported by other workers.[1, 2, 5, 8, 11, 13] There was no significant difference in sex distribution. Deaths among Negro infants far outnumbered deaths among white infants. This numerical difference becomes even more significant when one considers that the total number of white children under two years of age in the general population was approximately double the total number of Negro children in the comparable age group.[10] One gets the impression that sudden death is higher in the lower economic groups and that environmental factors are etiologically significant in the deaths. The seasonal occurrence of sudden death coincides strikingly with the peak incidence of diseases of the respiratory tract. Approximately 65 per cent of sudden deaths occurred in the period from November to April.

CAUSES OF DEATH

As mentioned before, the causes of sudden death in infancy are multiple. With few exceptions, however, there seems to be a fairly consistent pattern of distribution of these causes as determined by the many investigators in this field. The only differences, and these are minor, appear to rest on the individual interpretation of the findings at autopsy and to the weight assigned to these findings by each investigator.

Infection

Infection comprises the largest and most important group of sudden deaths. Of the infections, those involving the respiratory tract, including the middle ear, were most numerous. Next in frequency was septicemia. Farber[9] stressed the importance of fulminating infections in sudden death of infancy. In his cases the streptococcus was the most commonly identified organism, but a wide spectrum of bacterial invaders has subsequently been implicated. This merely confirms the concept of rapidly fatal sepsis. In a few instances the presence of a positive blood culture of pathogenic organisms was the only abnormal finding at autopsy. The Waterhouse-Friderichsen syndrome, with bilateral adrenal hemorrhage, has long been recognized in association with meningococcemia. Rich[14] demonstrated that a similar clinical picture may occur in the absence of massive adrenal hemorrhage and may be associated with severe, acute infections due to organisms other than the meningococcus.

Disease of the respiratory tract is the most common finding in sudden deaths of infants. It may be limited to a single area or may be widespread. Of a series of 126 cases, Adelson[3] found microscopic evidence of inflammation of varying degrees of severity in the respiratory tract in 106. Nevertheless in the absence of bacteremia or septicemia, it is difficult to ascribe the fatal outcome to the limited gross and microscopic anatomic changes, particularly when similar lesions have been noted as incidental findings in children dying rapidly after severe trauma.

Congenital Anomalies

Congenital anomalies of the heart and great vessels form the majority of these cases. Arey[4] points out that occasionally the presence of cardiac disease is not recognized during life, but is found only at autopsy. Grulee[12] makes the point that many of the congenital heart lesions found are compatible with life beyond infancy. The inference is that some added insult, such as a minor respiratory infection, may be sufficient in a child with such a defect to tip the scales unfavorably. When such a combination of events exists, a portion of the responsibility for death must be assigned to each. Endocardial fibroelastosis is a prime example of such an unfortunate combination.

Other congenital anomalies involving the central nervous system, respiratory system and digestive system have been implicated, on rare occasions, as causes of sudden death in infancy.

Miscellaneous

The very nature of this classification implies a wide variety of conditions capable of causing sudden death, no one of which, however, compares with infection or congenital anomalies in order of frequency.

Tumors are capable of causing sudden death in a variety of ways.

The prime example of this is the so-called silent brain tumor, usually located in the posterior fossa near vital centers. Hemorrhage within such a tumor may cause death within a matter of hours.[7]

Death during the course of, or shortly after, *surgical procedures* has long been recognized. Several mechanisms, either acting alone or in combination, offer the explanation for this occurrence. The choice of unsuitable anesthesia and its improper administration are a possibility. Sensitivity to preoperative drugs such as atropine, as well as anaphylaxis to the anesthetic drugs themselves, may also play a role. Abnormal sensitivity of vagovagal reflexes, especially those mediated by the carotid sinus, although difficult to prove, must be operative in certain instances. Deaths occurring 24 to 48 hours after the uneventful completion of elective surgery, in the majority of instances, have been due to overwhelming sepsis with the operative site as the probable portal of entry.[12]

Undetected and unsuspected *poisoning* is another unusual cause of sudden death. The outstanding example of this is the child who ingests lead-containing substances unknown to the parents, has a sudden convulsion, becomes comatose and dies, frequently in a matter of hours.

Aspiration of a foreign body, such as a plastic toy, is an infrequent cause of death, and aspiration of gastric contents as the sole cause of death almost never occurs. This latter event usually takes place in an ill or debilitated child, who, were it not for the aspiration, would ordinarily be expected to recover. This points up the importance of proper positioning of an infant after feeding, especially if he is ill.[2]

There still remains, in practically all the series of cases studied, a group of patients in whom no cause of death could be found. Perhaps as the techniques of viral culture are improved and refined, it will be found that many of these unexplained deaths are due to *viral infections* of various organs, or to overwhelming *viremia*. In 1951-53, as part of a study of sudden death in infancy undertaken by the office of the Chief Medical Examiner of Baltimore, various tissue samples were sent to the Laboratory of Infectious Diseases of the National Institute of Allergy and Infectious Diseases of the National Institutes of Health for possible isolation of viral agents. This study proved disappointing and was discontinued. The tissues were saved, however, in the deep-freeze, and in 1957, 31 cases were re-evaluated, using improved techniques of tissue culture. In five cases, from which no virus had been recovered originally, viruses were isolated.[10]

Obviously, not all the causes of sudden death in infants have been mentioned here. This merely emphasizes the need for careful, complete and painstaking examinations in all cases.

MISCONCEPTIONS ABOUT SUDDEN DEATH

Until the fairly recent past, accidental *suffocation* by bed clothing had long been considered one of the principal causes of sudden death in apparently healthy infants. As short a time ago as 1942 the Metropolitan Life Insurance Company listed this as the greatest hazard of in-

fancy. No solid conclusive evidence of the occurrence of such a process is available.[15] Careful postmortem examination will reveal infection as the cause of death in the majority of instances, but in some no adequate cause of death can be demonstrated. In the absence of an unequivocal history of suffocation such as accidental strangulation or homicidal suffocation, such deaths should not be attributed to suffocation and the family should be reassured that they were in no way responsible for the death of their child. It might be mentioned in this regard that a new hazard to infants has recently come into prominence as a result of modern technology. I refer to the increasing use of plastic bags as packaging materials and, in particular, to the use of these materials by the dry-cleaning industry in the form of large bags as a protective covering for clothing. Reports from all over the country have attributed a significant number of deaths by suffocation to these potentially lethal plastic bags being used by small children as playthings.

The pathologist can render a real service to the family and to society by establishing the actual cause of death and by refusing to incriminate the family on inadequate evidence. It is highly significant that in those communities where autopsies are done in all cases of so-called accidental suffocation, the number of deaths that can be attributed to this cause has gone down drastically.

Status thymicolymphaticus is a nebulous syndrome which at one time was said to be the commonest cause of sudden death in infancy. This view is no longer acceptable to most investigators today, and with good reason. The normal thymus gland varies within wider ranges of size and weight than does any other organ of the body.[6] Thymic involution occurs with great rapidity in a wide variety of illnesses, so that children dying suddenly may appear to have abnormally large thymus glands. The relatively large size of the lymph nodes and lymphoid aggregates usually encountered at autopsies in children is not generally appreciated.[4] There is no conclusive evidence that the thymus itself, together with the large amount of lymphoid tissue normally present in children, is in any way responsible for these deaths. It is suggested, therefore, that the term "status thymicolymphaticus" be relegated to those theories of medical thinking which have not been able to survive the light of the facts and careful investigation.

SUMMARY

The more common causes of sudden death in infancy have been discussed, and an attempt has been made to show that almost all these deaths can be ascribed to natural causes. The role of the attending physician has been outlined, and his responsibilities and obligations, both to the bereaved family and the local health authorities, have been suggested. The point has been made that sudden death gives little or no premonitory warning and that its causes are multiple. Painstaking investigation of these tragedies is required for a proper explanation. By so doing, both the family and society benefit by the

correct answer. Finally, in spite of our best efforts and in our present state of knowledge, some of these deaths must remain unexplained.

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MANAGEMENT OF MEASLES, CHICKENPOX AND SCARLET FEVER IN THE HOME

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MEASLES (RUBEOLA)

Great respect should be accorded measles, for it is potentially one of the more serious childhood illnesses. The morbidity may be great. Complications are numerous and often severe. It should be emphasized to the parents that measles is not just another minor affliction of childhood. They should be told of the possibility of complications and instructed to report any unusual signs or symptoms, although an alarmist attitude should be avoided. Barring severe complications or sequelae, most cases of measles can be managed very well in the home.

Home management consists mainly of symptomatic therapy. Fever is the symptom that is probably of most concern to parents. It usually does not run extremely high, but may, at the height of the rash, run in the range of 104 to 105° F. Aspirin, 60 mg. per year of age at 4- to 6-hour intervals, will usually control the temperature. Occasionally tepid water baths or sponging with isopropyl alcohol may have to be used in conjunction with the aspirin. Pyralgin, an aminopyrine derivative, given in 0.25- to 0.5-gm. doses, may be used if the fever does not respond to ordinary measures. If the patient is known to have had previous convulsions associated with fever or if there is a strong family history of convulsive seizures, it is wise to give phenobarbital in an effort to prevent such episodes.

Cough is often the most exasperating symptom to both the patient and those who must listen to it. The cough is typically harsh and nonproductive and is due to inflammation of the respiratory mucosa. It may be almost constant, and severe enough to cause reflex vomiting to the extent that the patient becomes dehydrated. Conventional expectorants commonly used in respiratory infections have little or no effect upon the cough. Medication which will act by depressing the medullary cough center may be necessary. Codeine is the time-honored

cough depressant of this type. There are many preparations available, however, which contain synthetic, codeine-like drugs which supposedly have fewer side effects. I personally feel that codeine is still the superior drug. Parents should be told to follow directions. By suppressing the cough in this manner there are other functions which are likewise depressed.

The photophobia and conjunctivitis are sometimes distressing to the patient and always of great concern to the parents. It is a common belief that damage to vision will result if a child with measles is not kept in a dark room. One should point out that the darkened room is only for the child's comfort. There is no need to keep the room darkened unless there is photophobia. If conjunctivitis becomes purulent, warm salt water (1 level teaspoonful per pint) irrigations are used along with an antibiotic ointment or solution such as Neosporin. Systemic antibiotic therapy is not used.

The use of antibiotics prophylactically in uncomplicated measles is still a controversial subject. I feel that routine administration of systemic antibiotics is unnecessary. If the child is known to be prone to bacterial respiratory infections or has some condition which makes for a poor response to bacterial infections, then systemic antibiotics may be indicated.

Complications should be suspected if the temperature remains elevated after the rash has begun to fade, if the cough takes on a different quality or there is pleuritic pain, if lethargy is unusual or if there is earache or headache and vomiting. Most respiratory complications, including otitis media, are bacterial and should be treated with the appropriate antibiotics and other measures. If, however, the child shows signs of central nervous system involvement, it is most probably viral, and hospitalization is indicated, since this is often a severe and dreaded complication.

Itching is occasionally a bothersome complaint when the rash begins to fade and desquamation is taking place. Most often this can be controlled by the use of a bland lotion with a vanishing cream base such as Baby Magic. Baths with a few cups of cornstarch added or one of the commercial colloidal preparations may be beneficial.

Other siblings in the household should be prevented from getting the measles if possible. The most efficacious substance for this purpose is human gamma globulin (see p. 68).

CHICKENPOX (VARICELLA)

Chickenpox is ordinarily a relatively mild childhood illness. The morbidity rate is much less than that of measles, and may even be decreased if the patient is properly managed at home. Usually systemic manifestations are mild. There is a low-grade fever, often a frontal headache, and there may be "flu-like" muscular aches during the preeruptive and early eruptive stages. These symptoms can be controlled with appropriate doses of salicylates. The most annoying symptom is itching, and it leads to the most common complications of chicken-

pox—skin infections such as impetigo, cellulitis, abscesses. The mother is instructed to cut fingernails short and keep the hands clean with pHisoHex, a detergent which contains hexachlorophene. Cornstarch baths may help relieve itching. If there is any sign of secondary skin infection, an antiseptic soap such as Dial is used for cleansing. Antihistimines are helpful in the control of itching. I have found that Temaril, a phenothiazine derivative, works very well. If it is used, keep in mind that the same side effects that have been observed with other phenothiazines could occur. If secondary bacterial infections do occur, they should be treated according to their severity. Usually the superficial infections respond to adequate cleansing with soap and water and, in some cases, topical antibiotics. More extensive infections with associated systemic manifestations will require more vigorous therapy with systemic antibiotics.

A common question asked is, "What can I give my other children to prevent them from getting chickenpox?" The answer at present is, "Nothing." Immune globulin and other materials have not been successful to date. If a child is on steroids and is exposed to chickenpox, it would be wise to discontinue the use of hormones and perhaps give gamma globulin. Fatal cases of chickenpox have been reported in instances in which the patient was taking steroids.

In this illness, as in many others, there are times when hospital care is indicated. Such indications would include those cases in which there are severe bacterial complications, encephalitis, and so forth.

SCARLET FEVER

The etiology of this illness is bacterial rather than viral, as in measles and chickenpox. More can be done for the patient by the use of specific medication. Nevertheless, symptomatic treatment is still important. Since the cause of the disease is a strain of beta hemolytic streptococcus, penicillin is the drug of choice. Studies have shown that the incidence of complications is less if therapy is continued for 10 days. Different methods may be used to accomplish this. Procaine penicillin may be given by daily injection for the first few days during the acute illness and then an oral preparation may be used or an injection of benzathine penicillin may be given. If the patient is sensitive to penicillin, another antibiotic such as erythromycin or tetracycline must be used. The parent must be impressed with the importance of continued therapy even though the child may be practically asymptomatic within 48 to 72 hours.

During the acute phase of this illness children are usually extremely toxic and have high fever, frontal headache and nausea and vomiting. If antibiotic therapy is started early, these symptoms will greatly subside after about 24 hours. Clear liquids given at frequent intervals in small amounts are usually tolerated, and antiemetics are seldom required. The headache and fever usually respond to salicylates. The same precautions should be observed in the child who is prone to febrile convulsive seizures. Bed rest at first and then limited activity

should be enforced for a total time of approximately one week. Here again it is often difficult, after 48 to 72 hours, to explain why limited activity is necessary, because, as the mother says, "He feels so good." The child with scarlet fever should be kept away from other children, and there should be no visitors.

Prophylactic penicillin should be prescribed for family contacts who have no manifestations of the illness. Penicillin V or K, 200,000 units 2 or 3 times daily orally for 3 or 4 days, seems to suffice. A single injection of benzathine penicillin will also be adequate prophylaxis.

In cases in which treatment has been adequate complications are less likely to occur. Nevertheless one should watch for them, particularly in families in which rheumatic fever or nephritis has occurred. Parents are instructed to report any unusual fever, joint manifestations, urinary changes, and so on. After the illness has apparently subsided urine specimens are examined at weekly intervals for several weeks. A complete physical examination within four weeks of recovery is advised.

SUMMARY

Measles, chickenpox and scarlet fever are common childhood diseases which are cared for and treated most often in the home. All may at times be so severe or have such complications as to require hospitalization. Adequate and thorough instructions to the one who will be carrying out home therapy will add to the comfort and decrease complications in these patients. Proper handling of contacts and adequate prophylaxis plus diligent reporting to health authorities may prevent these illnesses from reaching epidemic proportions.

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STOMATITIS

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Stomatitis, as such, does not exist as a clinical entity. The term may be said to be a medical wastebasket. Out of this wastebasket can be pulled several diseases and conditions, all of which have a predilection for the oral mucosa. The disease which is probably most responsible for this misuse of the term "stomatitis" is *primary herpetic gingivostomatitis*. Certainly it is the most common disease affecting the oral mucosa between the ages of one and four. Many names have been given to this infection. The more common ones have been ulceromembranous stomatitis, aphthous stomatitis, Vincent's stomatitis and trench mouth. For many years it was thought to be caused by a fusiform bacillus and a spirochete. Consequently much undeserved and even dangerous therapy has been directed to herpetic stomatitis. This has included the use of arsenicals. Some 23 years ago the causative agent was isolated and identified as herpes simplex. It has since become apparent that all the conditions listed above were in reality the primary infection with herpes simplex or, in the more recent nomenclature, *Herpesvirus hominis*.

The disease can occur at any age, but is certainly most common in early childhood. There is usually considerable fever, which precedes the oral lesions by one to three days. The fever may last up to 10 days. Excessive salivation is a frequent early symptom. The oral lesions are at first vesicles, which rupture in a short time to form shallow white ulcers. There may be only one or two ulcers; or the entire oral area may be involved, including the tongue, buccal mucosa, palate, pharynx and tonsils. There is usually a rather notable redness and tenderness of the gingival margins. The mouth becomes so tender that the child will not eat or drink. If dehydration occurs or is imminent, the condition is no longer an office problem, but requires parenteral fluid therapy.

The attempts I have made to alleviate the oral discomfort by local anesthesia have been most unsuccessful. Neither cocaine derivatives nor antihistaminics have worked. The use of a cleansing mouth wash in older children, such as Cepacol, is helpful. In younger children the most important therapeutic factor is maintenance of fluid and, if

possible, caloric intake. Milk and milk products seem to work best. Finally, the most difficult problem for the physician is in reassuring the family that the disease is self-limited.

Thrush or *oral moniliasis* is not often an office problem, since it usually occurs in hospitalized premature or debilitated infants. When the disease occurs in the healthy infant, it is usually easily treated. Nystatin or Mycostatin Suspension (100,000 units per cubic centimeter) applied 3 times daily to the oral mucosa will clear the monilia. In resistant cases the use of 1 per cent gentian violet is effective.

The other types of infective stomatitis are not often a problem, and most occur as the enanthem of a generalized infection. This includes the Koplik spots of measles, the erythema of rubella, the vesicles of chickenpox, and the soft palatal vesicles of herpangina. Recently there has been described an enanthem due to ECHO virus type 9, which involves the buccal mucosa. It consists of tiny white spots resembling the enanthem of measles. One other oral infection should be mentioned, and that is noma or *gangrenous stomatitis*. It occurs in severely debilitated infants and should be treated only in the hospital.

Deficiency states causing stomatitis are now unusual in this country. The most likely are scurvy and pellagra. Scurvy will not cause the gingival lesions unless the child has erupted teeth.

Toxic stomatitis is seen following lye ingestion or mercury intoxication. The latter may be the cause of an especially severe gingivitis which occurs in acrodynia. The most common toxic stomatitis is that following the ingestion of very hot foods.

The most diffuse of all stomatitis is probably that which is allergic. Many agents may be responsible, and it is usually the result of direct contact with the offending allergen.

CONCLUSIONS

The problems of stomatitis are twofold. The first problem is that of diagnosis. Since most of the diseases are benign and do not lend themselves to specific therapy, the second problem is usually that of reassuring the parents. But then this, in essence, *is* the office practice of pediatrics.

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TEETH

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A large field of special interest to those who devote time to children concerns growth and development problems. There is no exception in this respect so far as they relate to dentistry. We shall attempt to list these problems somewhat chronologically as they may be expected to appear during the child's growth. Generalizations are often dangerous, but perhaps most of the dental problems of children occur because the teeth are partially external structures. This makes them particularly vulnerable to environmental insults which may affect the integrity of the mucosa around each tooth. Before teeth erupt there are few if any oral problems of infants, but they promptly begin with the eruption of the first teeth.

ORDER OF ERUPTION

The eruption of a tooth represents the culmination of a series of developmental stages which began during the fourth or fifth week of embryonic life and will continue into young adulthood. It will not end until the third permanent molar emerges.

Eruption usually begins by about six months of age with the emergence of four primary central incisors, two below and two above. After this there is a rest period of about four months, at which time the next crop of four teeth appears. This pattern of four teeth every four months is a handy "rule-of-thumb." Thus:

AT AGE	NUMBER OF TEETH ERUPTED
7 months	4 central incisors
11 months	8 teeth
15 months	12 teeth
19 months	16 teeth
23 months	20 teeth

It should be noted that after the first group, consisting of four primary central incisors, has erupted there is no specific designation of what comprises the succeeding groups. Frequently their order is central incisor, lateral incisor, primary first molar, cuspid and primary second molar. Almost always the central incisors are the first teeth

to erupt, and usually the primary second molars are the last to erupt. Otherwise there is considerable variation. The lower teeth usually precede the corresponding upper teeth. Age for age, girls' teeth tend to precede boys' teeth in their eruption schedule.

SYMPTOMS OF TEETHING

The occurrence of symptoms, including fever, loss of appetite, sleeplessness, increased salivation and drooling, gnawing, coughing and convulsions, during the time when the primary teeth are erupting has led to much controversy and speculation. The controversy rages over the relation, if any, between the eruption of teeth and such symptoms as these. Some investigators and authors have maintained that the difficulty a child may have while teething is a pathologic process and that it is the cause of the symptoms. Others maintain that the symptoms are only coincidental. Whatever the truth may be, the teething process is usually a rapid one, and any associated symptoms seem to subside once the tooth has erupted through the mucosa. Any symptoms still persisting after the tooth has erupted are presumably unrelated, and one should search elsewhere for their cause.

The mucosa covering a tooth will occasionally be inflamed and irritated just before the emergence of a tooth. Lancing of this overlying mucous membrane is hazardous in that it may provide entry for infection. Furthermore, this procedure usually aggravates the problem it is supposed to cure. It does seem that an object which is hard and cold on which the infant may gnaw may be useful as a symptomatic measure.

DENTITIO PRAECOX

Occasionally a child is born with a tooth or two already erupted. These teeth are usually paired and in the lower central incisor area. They may be normal primary centrals, precociously erupted, or they may be supernumerary teeth. If they are supernumerary, their texture and root formation are abnormal. If these precocious teeth interfere with the infant's nursing, they should be removed. They may lack root formation, making them easily loosened. In this case they should be extracted because of the danger of aspiration, if for no other reason. A careful x-ray examination should be made to differentiate between supernumerary teeth and normal teeth precociously erupted. If precociously erupted normal primary incisors are extracted, their absence will result in abnormal mandibular development.

THUMB-SUCKING

A controversy which frequently arises whenever physicians and dentists discuss mutual problems is that of prolonged digital habits, especially thumb-sucking. Dentists, especially orthodontists and pedodontists, are upset because attempts have not been made to correct this habit before it has produced a dental malocclusion or malalignment. These

dental specialists, looking backward from the time of their first examination of such a malocclusion, say, "Why wasn't this thumb-sucking habit corrected before it produced this malocclusion?" The pediatrician or the family physician, to whom this complaint is often directed, often replies, "This sucking habit is innocuous, will be discontinued by the child as he grows older and need not be interfered with."

It is true that an intense, active digital habit, practiced over a long enough time, can produce a severe upper anterior protrusion. This is often complicated by a constriction of the upper dental arch because of the inward pressure of the buccal musculature. The upper arch constriction and the posterior pressure of the thumb and hand on the mandible can result in an inhibition of the normal anterior positioning of the mandible. The total deformity can be extreme and difficult to correct. Certainly some earlier interference with this kind of habit should be undertaken.

It now seems somewhat clearer that the attention of both physician and dentist should not be directed so much to the thumb-sucking habit, but to the thumb-sucking child. To be sure, so many infants have a habit of sucking the thumb or finger that it is often considered a part of normal development. Most children discontinue this digital habit some time during early childhood, often by the third birthday. Some children, however, continue the practice after this early age, maintaining it largely as a hand-occupation habit. It may be speculated that smoking by the adult is a remote reflection of this hand-occupation habit. Such a habit may consist in passive holding or resting of the digit in the mouth without much muscular activity of either the digit or the oral muscles.

It seems that what the orthodontist and pedodontist are chiefly concerned with are those children who practice a digital habit intensely, agressively and passionately, for long periods at a time, and continue to do so even until their permanent incisors begin to erupt after the seventh birthday. Such a child is obviously immature emotionally and is a cause of concern to both physician and dentist. His habit is only a symptom.

Once this philosophy of individualization is achieved, the approach to treatment may also be individualized. Child and family counseling had perhaps best be undertaken by the family physician in an effort to uncover emotional factors which might be responsible. The dentist may be ready to provide the child with a "habit reminder" appliance, an intraoral device intended to remind the child that the digit is back in its old haunts where it shouldn't be. Parenthetically, it is suspected that sometimes such a "brace" may be a sort of status symbol, but nevertheless very useful as a means of setting the child apart from his contemporaries.

ACCIDENTS AND INJURIES

This subject is introduced because it is partly developmental and is frequently overlooked. Injuries to the teeth and their sequelae are

developmental because they occur mainly at two age periods when motor coordination is being tested in a new and different way. Thus the infant, after a period of aimless movement of arms and legs, followed by a quadrupedal type of locomotion, apparently feels that he is built for bipedal primate locomotion and tries it out. During this experimental period there are many physical contacts with many immovable objects. When these contacts are made by way of the child's young primary incisors, a problem is created which is frequently overlooked or minimized by the examiner.

Later on in a child's life there is another testing period when body contact games and sports are being tried out. This developmental period is also fraught with dental hazards, complicated by the kind of dentition development of the individual child. Thus, when a child's permanent incisor dentition development is characterized by a protrusion of these teeth, they frequently are the first point of contact with an object directed at the mouth.

The injuries produced by these accidents differ because of the development of the child. The primary teeth, being supported in less well calcified alveolar bone, tend to be dislocated and displaced. The permanent teeth of the older child tend to be fractured.

The *treatment* of injuries to primary incisors frequently consists in repositioning the displaced tooth (or teeth) into more or less normal position in the dental arch and securing it (or them) there for a few days until supporting bone matrix can be rebuilt. This splint may be easily constructed by the dentist from self-polymerizing methyl methacrylate resin which is then cemented over the teeth with medicated zinc oxide-eugenol. Even this rapid extemporaneous treatment is unnecessary if the accident has driven the primary incisor into the alveolar process. An incisor injured in this way will re-erupt and usually take its normal place in the dental arch.

There is a remote sequela of a displacement injury to a primary incisor. Its permanent successor may be disturbed in its follicle and develop in a distorted form, either of its crown or its root, depending upon the stage of development at the time of the accident.

The treatment of injured permanent incisors is a technical dental problem and need not be discussed here. Suffice it to say that such treatment is divided into an emergency phase, an intermediate phase intended to tide the patient over the adolescent developmental period, and the final phase when the patient is a young adult. The important consideration is that an accidental injury needs dental consultation at once and that the dentist is best qualified to make the diagnosis of the extent of the injury and to institute appropriate treatment. With present knowledge it is no longer enough to say, "Nothing can be done until the patient is 18 years old."

A final word can be included here about prevention of dental injuries to school children who are engaging in body-contact games such as football or basketball. Such a preventive program consists in equipping a football team or a basketball team with mouth guards similar to boxers' mouthpieces, but much less cumbersome. Newer

latex-like materials make such a streamlined appliance feasible, and its cost is modest. The cooperation of the local dental profession is necessary in order to provide a model of each player's teeth over which the latex material is processed to make an individual mouth guard. These guards protect the players from dental injuries and are easily and inexpensively fabricated. They are certainly worth the effort in prevention of injuries which are often difficult and painful to treat as well as disfiguring.

SUMMARY

As in other fields devoted to the health care of children, dental practice also has problems peculiar to youngsters as contrasted to adults. These problems are related here, as elsewhere, to growth and include such matters as abnormalities in the eruption of teeth, malocclusion or malalignment due to thumb-sucking, and injuries during various stages of growth and development. Proper management and disposition of some of these dental problems depends upon an understanding of these relations.

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DISEASES OF THE EAR, NOSE AND THROAT

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Since sulfonamides and antibiotics became available the pediatric care of diseases of the ear has, for the most part, become office procedure. When it is necessary to refer these patients to an otologist, it is usually for some operative intervention or because of persistence of the condition. Surgery has become rare compared with the pre-antibiotic days when myringotomies and mastoidectomies were common procedures. Twenty-five years ago pediatric interns would make ward rounds with trays of sterilized myringotomy knives and open most bulging drums at this time. Routine office management of otitis media consisted in myringotomy and irrigation of the canal. At present many pediatric residents unfortunately finish their appointments without having done a myringotomy, a procedure which is still useful under certain circumstances.

ACUTE OTITIS MEDIA

Of all the pediatric ear problems, acute otitis media is the most common. A child with an earache should be considered to have otitis media until proved otherwise. The tympanic membrane will show evidence of infection within a short time after pain begins. The only condition other than otitis media, otitis externa, boil in the canal, mastoiditis, mumps or foreign body causing earache is occasionally that referred from an erupting molar by way of the nerve to the tympanic membrane (chorda tympani), a sensory branch of the facial nerve. In this latter case the canal and drum appear normal and there is swelling of the gums over the unerupted molars. The pain in this case is usually not severe.

Whenever there is a complaint of earache, one should get a good view of the ear drum. The battery-handled otoscope is the most practical instrument for the pediatrician. One quarter and ⅛-inch specula are used. If the drum is not easily seen with one speculum,

the other should be used. Small flakes of cerumen sometimes do not completely obstruct a good view if both specula are used, rotating them in a circular fashion. If wax prevents a good view of the essential landmarks of the drum, and there is earache, the wax should be removed. Noncutting ear curets, nos. 0 and 1, are best for this purpose in infants and children. Irrigation is impractical under five years of age. The external auditory canal is extremely sensitive, and removing wax by curet must be done very gently with the child's head held firmly. Trauma to the canal causes bleeding, which is easily stopped with successive cotton applicators. In older children irrigation by using an ear syringe with warm water is much less painful than the curet. This is done with the child sitting, his head bent over a wash basin. The water is injected forcefully into the ear canal.

If the cerumen is impacted and not readily removable by curet or irrigation, softening agents may be used. Cerumenex, 3 or 4 drops in the affected canal every 6 hours, and a plug of cotton placed in the ear canal will usually soften the wax in 24 hours. Doxinate liquid, 10 per cent (a surfactant laxative), is equally effective. After softening, the wax is easily removed with cotton applicator, curet or irrigation.

The *management* of otitis media involves (1) alleviation of pain; (2) treatment of the infection and associated conditions and follow-up to normality of drum and hearing; and (3) prevention of recurrences.

Alleviation of Pain

This takes priority in the care of earache. In young infants the pain is manifested by crying and tossing the head from side to side. Fever is variable, but there is often systemic response with fever and sometimes febrile convulsions. Older infants and children pull on their ear, sometimes hit the side of their head with their hand or complain of headache on the affected side. Impaired hearing is frequent. Occasionally on routine examination the drum is found to be bulging in an infant without any fever or other sign of infection. This is probably due to a slowly developing otitis. There is sometimes spontaneous rupture of the drum with drainage, with or without previous symptoms.

Relief of pain can nearly always be obtained by using narcotics and analgesics judiciously. Paregoric, from 10 drops to a teaspoonful (infancy to 10 years) mixed with sugar water or soft drink, and crushed aspirin, ¼ grain to 5 grains (infancy to 5 years or over), may be given and can be repeated in 2 hours if necessary, but no oftener than 3 times in 24 hours. It is rare that narcotics are necessary more than twice. For children able to swallow a tablet, one may give A.P.C. plus codeine, ⅛ to ½ grain (Empirin compound with codeine no. 1-2-3); for 4 years ⅛ grain or no. 1. Empirin with codeine, to no. 3 for 14 years of age. One repeat dose in two hours is usually sufficient to stop pain. Heat from an electric pad or hot-water bottle will sometimes help, but small children will usually not lie still. With this routine, ear drops have been found to be unnecessary for relief of pain.

Treatment of Infection and Associated Conditions

The tympanum becomes dull and red almost immediately after the onset of symptoms. Later it bulges. Medication for the relief of pain is frequently started at home after a telephone call by the parents. It is necessary to emphasize to them that cessation of pain does not mean the end of infection, and the child should be examined. This should be done with emphasis on the nose, throat and ears, and with palpation of the mastoids for tenderness and testing for any evidence of impairment of hearing. This is easily tested by having the cooperative child repeat high frequency words such as "sister" and "seventy-seven" and low frequency words such as "brother" and "mother," pronouncing them to him from across the room, testing one ear at a time.

Treatment

Injection of Crysticillin Aqueous Penicillin, 600,000 to 1,000,000 units, is made in the lateral aspect of the thigh, although it can be given in the arm of older children. Declomycin, syrup or capsules, 3 to 6 mg. per pound per day, divided into 3 to 4 doses, or other tetracyclines, 25 mg. per pound per day in divided doses, are given for oral use for 3 to 4 days. If there is much systemic reaction and the drum is bulging, the child should be followed up daily with injections of penicillin for three days until the infection subsides. When the infection is not severe, the ear should be rechecked in three days. If there is no improvement in three days, the antibiotic is changed to erythromycin (Ilosone, same dose as Tetracyn) or Chloromycetin (50 mg. per pound per day). After the drum has cleared, hearing is rechecked; if it is normal, the child is discharged. When there is no improvement after 7 to 10 days (and this is rare with vigorous treatment) with continued bulging of the drum because of either sterile fluid or pus, myringotomy must be considered because of the damage of permanent hearing loss.

Infants up to two years of age usually react more to otitis media than do older children. In this age group if the drum is bulging and seems nearly at the point of rupture, a myringotomy in the posterior inferior quadrant of the drum should be considered. This is preceded by a sedative such as Syrup Temaril, ½ to 1 teaspoonful, or Nembutal suppository, ½ grain, ½-hour before the myringotomy. The child should be well wrapped and held firmly for this procedure. Antibiotics are given as above. The ear usually stops draining within 24 hours, and the drum returns to normal appearance in a few days.

Frequently a child is brought to the office with draining ears with or without previous symptoms such as fever and pain. After a general examination the canals are gently cleaned with cotton on an applicator. The child's mother is shown how this is done and how to wind cotton on a toothpick so that there is a loose end of cotton on the stick. If pus is tenacious, the patient should have ear irrigations three times

daily with water and peroxide in equal parts, using an eye dropper until there is no more bubbling. When the ear canal is clean, it is dried and antibiotic ear drops such as Otobiotic or Tyotocin are instilled, and a pledget of cotton is used as an ear plug. Systemic antibiotics are used in the same manner as in nondraining otitis until the drum has a normal appearance. This may take up to a fortnight to heal unless the drum is chronically perforated. In this case the child should be referred to an otologist.

Upon examining the painful ear bullous myringitis is frequently found. Within a few days the bullae dry up or occasionally rupture. Sometimes there is a complete perforation of the drum. This is managed in the same way as otitis media with discharge.

Rarely a child has a swelling behind the auricle, pushing it forward. If the ear has been draining and the swelling is tender, mastoiditis is probable, and the child should be referred to an otologist. With a normal drum this cellulitis should be treated as acute otitis for a few days, and results are usually good.

Since ear infections are usually secondary to infections of the nose and throat, attention must be paid to these in order to treat the former adequately. Management of these is discussed in the relative sections.

Catarrhal otitis media is usually manifest by impaired hearing and sometimes mild pain. The drum is dull and bulging, but not inflamed. Local nasal decongestants such as N.T.Z. spray (always used with the patient sitting or standing) 3 times a day in each nostril, and systemic decongestants such as Elixir Novohistine, ½ to 1 teaspoonful twice daily, are effective. If hearing and the appearance of the drum do not return to normal in two weeks, the patient should be referred to an otologist for aspiration of the middle ear or myringotomy. Systemic nasal decongestants may be given for long periods of time.

Prevention of Recurrences

When otitis media is recurrent in children over one and one-half years of age, adenoidectomy, with tonsillectomy, should be strongly considered. When indicated, this procedure gives most satisfactory results. As an alternative, daily triple sulfa in a dose of 7½ grains under 30 pounds of weight, and 15 grains daily in larger children with systemic nasal decongestants may be prescribed during the fall, winter and spring months. The child should be checked monthly while on this regimen.

In infants with recurrent otitis media an allergic basis should be considered. Milk, eggs, wheat, orange juice and chocolate are common allergens. Dramatic decrease in the frequency of attacks has sometimes been noticed when the offending food is omitted from the diet. If the attacks of otitis develop after a new food has been introduced into the diet, this food is first eliminated and the child watched for a week. If otitis recurs, other foods are eliminated. Milk has been found to be the most common offender in recurrent otitis. Soybean prepara-

tions are substituted. Orange juice may be stopped and multivitamins prescribed. Systemic nasal decongestants are used.

External Otitis Media

External otitis media (swimmer's ear) is most frequently seen during the summer months of the year in children over four years of age. There is pain when the ear is moved, the canal is swollen, and frequently there is fever. If the pain is severe, it is controlled by narcotics and analgesics as in otitis media. Hot compresses of Burow's solution are applied three times daily for a half-hour to an hour. The canal is cleaned daily with peroxide and water (equal parts) on a cotton applicator, dried, and a wick of cotton gauze left in the canal. Antibiotic ear drops with steroids such as Corticosporin, 4 drops 3 times a day, are put into the canal. Antibiotics systemically are prescribed. After the acute phase has subsided the canal is painted with 10 per cent silver nitrate on a cotton applicator. The child should not go swimming until he has recovered.

External otitis media tends to recur, and there is no satisfactory method of preventing this. A bathing cap which straps under the chin should be worn during swimming, after which 3 drops of an antibiotic ear drop such as Tyotocin may be instilled into each ear canal and a cotton plug put in for ½ hour.

Foreign Body

See Foreign Bodies, page 103.

NOSE

Examination of the nose is best done by using a ¼-inch ear speculum. This is a neglected procedure in examination of children. The size of the airway is noted on each side, the septum is visualized for deviation, and Hasselbach's area is observed for superficial vessels and ulceration. The turbinates are examined for normality or bogginess of allergy or infection. Whether there is a discharge, mucoid or purulent, is noted.

The septum is occasionally found to be displaced at birth and may be straightened by ordinary manipulation.

Soon after the infant has been discharged from the hospital the parents occasionally note that the infant cannot breathe through the nose. Examination reveals the nasal passages to be completely closed off by edema of the nasal mucosa. Ascertain whether there is structural blockade of the nose by passing a no. 8 French catheter through each nostril into the nasopharynx. If the catheter passes, the parents can be reassured that the obstruction is temporary. Local 0.25 per cent Neo-Synephrine and a systemic antihistamine as Elixir Novohistine, 10 drops 3 times a day, may be prescribed. However, the condition clears in spite of medication in three to six weeks.

Nasal Discharge and Obstruction

These are common as a result of infection or allergy. One of the best signs that a child has a nasal allergy is the "nasal salute." This is the name applied to a frequent gesture of the allergic child as he rubs his nose upward with his fingers and the palm of his hand. Children will frequently do it in the office, or the parents will describe it when questioned. Examination of the nose reveals pale turbinates with mucoid discharge. Nasal allergy may be verified by examination of nasal secretions. The child is asked to blow his nose on a glass slide. The mucus is teased out into a film with the corner of another slide. It is allowed to dry and then stained with Hansel's stain. A large percentage of eosinophils indicates allergy.

Unless there are other manifestations of allergy such as hay fever or asthma, allergic nasal rhinitis is usually well controlled by antihistamines such as Elixir Novohistine, ½ to 1 teaspoonful 2 or 3 times a day, depending upon the age, or tablets in older children. If one antihistamine does not work well, another one or an increased dose of the same one is considered. For severe, persistent, recurrent nasal allergy an allergic workup is indicated.

In infants and children up to three or four years, who are unable to blow their noses, nasal suction is used when there is profuse discharge. A Davol 2-ounce ulcer syringe or a glass-tipped nasal aspirator is recommended. The parents are shown how to use these so that with the child's head held firmly, the tip of the syringe is directed into the nasal opening and not against the inside nasal mucosa. The bulb is squeezed before inserting the syringe tip into the nose. Nose drops such as Paradrine-Sulfa or Neo-Synephrine, 0.25 per cent, 2 to 4 drops, are instilled into each nostril with the child's head held back over the edge of the bed or table for 3 to 4 minutes and then flexed forward. If a nasal spray is preferred, Pediatric Neo-Synephrine Spray with the child standing or sitting, one squeeze on each side three times daily, works well. Oral antihistamines are often helpful and may be prescribed in a cough syrup if there is associated bronchitis. Often there is associated otitis media. If there is profuse purulent nasal discharge, an antibiotic such as tetracycline for a few days is effective. Give 25 mg. per pound daily in divided doses.

Nosebleed

This is frequent in children and is usually due to a ruptured superficial blood vessel in Hasselbach's area. It occurs most often after the child has gone to sleep. Home management for stopping the bleeding consists in pressing the outside of the nose on the affected side against the septum for 10 minutes with the child sitting up. It is essential that the parents show no apprehension.

Hypertension, rheumatic fever, hemorrhagic tendencies or foreign bodies should be ruled out. Treatment consists in aspirating the nasal canal with an electric aspirator or cleansing it with an applicator and

applying 10 per cent silver nitrate to the bleeding points. Usually there are several small erosions, and in this case the entire area is cauterized. Nosebleeds tend to recur in spite of all treatment. The important thing is to be certain that it is a local condition and to reassure the parents.

Trauma to the Nose

Nosebleed from a fall on the nose is sometimes due to a fractured nasal septum or nasal bones. The child should be adequately examined as soon as feasible. The nasal bones are first palpated for displacement, blood is aspirated from the nose, and the septum is carefully examined for deviation. When there is swelling, it may be necessary to x-ray the nose to confirm fracture. Treatment of fracture should be carried out by a rhinologist.

Foreign Bodies

Young children are always putting either their fingers or foreign bodies into their body orifices, especially their ears and nose. Paper wadding, buttons and food are the most common. Occasionally an insect is found in the ear canal. The child should be well mummied, the head held firmly by the mother or nurse, the foreign body well visualized, using a head mirror, and if possible the foreign body removed by aspiration or with a curet or forceps. If it is not easily removed, the child should be referred to an otorhinologist so that it can be better done under anesthesia.

MOUTH AND THROAT

Monilial Infections

These most frequently occur in the first six months of life. They are manifest by white plaques on any part of the oral cavity, which are adherent and cannot be easily rubbed off like dried milk. A thick coating frequently forms on the tongue. This can be easily scraped off with the side of a tongue blade or butter knife and kept clean by digital cleansing after feedings. When monilia involves the inner side of the cheeks, gums or roof of the mouth, these areas are also cleansed after feeding with a piece of gauze wound around one's little finger, dipping it in warm water and rubbing until clean. Aqueous gentian violet, 2 per cent, is applied to the inside of the mouth nightly for 3 nights. Mycostatin Suspension, 1 cc. 3 times a day, is given orally for one week.

Tonsillar Infections

These are frequently associated with systemic reactions. Frontal headache, fever, vomiting and chills associated with sore throat are prob-

ably streptococcal, although streptococci have also been found in mild sore throat. Treatment in cases with systemic response consists of penicillin, either oral or by injection. Injection is preferred for the initial therapy, since vomiting is frequent. Crysticillin, 600,000 to 1,000,000 units intramuscularly, and then oral penicillin, Erythrocin or the tetracyclines for 4 days appear to be equally effectual. When there is a strong suspicion that the infection is streptococcal, penicillin as injectable Bicillin, 600,000 units, or oral penicillin is given for 10 days. For mild to moderate sore throat triple-sulfa, 1 grain per pound per day in divided doses for 4 days, is satisfactory.

Children are frequently seen for high fever without complaining of sore throat who upon examination are found to have acute pharyngitis. Treatment is as above.

Peritonsillar Swelling and Abscess

Associated with tonsillitis there is ocassionally swelling of the soft tissues around the tonsil. There is pain, fever, trismus, drooling, nasal voice and dysphagia. Treatment consists in forcing nutrient fluids taken by straw if necessary, and antibiotics. Give injections of Crysticillin, 600,000 to 1 or 2 million units daily for 3 days, plus tetracyclines orally (see dosage in otitis media) for 3 days; if there is no improvement, change to Erythrocin or Chloromycetin. It usually takes a week for the abscess to resolve. If the swelling becomes fluctuant, the abscess should be incised and drained.

These children should be seen daily until the trismus is gone and the swelling subsides. When home control and fluid balance are not satisfactory, the child should be hospitalized.

Cervical adenitis is frequently associated with tonsillitis. Treatment is the same as for acute tonsillitis. If the adenitis does not clear up in a few days, acute mononucleosis or tuberculosis should be ruled out. A blood cell count, tuberculin test and heterophil antibody will usually clarify the diagnosis.

Herpangina, manifest by fever, sore throat and vesicles on the anterior pillars of the fauces, is common during the summer months. Treatment is nonspecific with forced fluids and aspirin, 1 grain per year of age 3 times a day to 5 years, after which the dose is 5 grains 3 times a day.

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TONSILS AND ADENOIDS

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The question ever present with the physician seeing many children in his practice is what to do about the problem of the child who is having trouble with his tonsils. Perhaps the problem is not the tonsils themselves, but the effect of enlarged or diseased tonsils on the surrounding and related structures, or, even more important, the effect that they may be having on the child as a whole, on his general physical condition.

As in many fields in medicine, the pendulum swings from the radical approach to the conservative. Many tonsils have been removed that may not have needed to come out and the child would have been better off without the operation. In recent years a more conservative and sensible approach has become widespread, and the "middle of the road" policy has become the more approved one. It is really impossible to generalize on the subject, and each case must be decided on its own merits.

INDICATIONS FOR TONSILLECTOMY AND ADENOIDECTOMY

Simply stated, it is my opinion that there are three major reasons for considering tonsillectomy and adenoidectomy in a child: (1) repeated infections of the tonsils and adenoids, (2) repeated bouts of infection of the middle ears, and (3) severe or repeated infection of the cervical glands.

Some children seem prone to localize almost any respiratory infection in the tonsils and surrounding tissues. We have all seen the swollen, reddened, almost bulging tonsils that seem to block the air passages and often interfere with swallowing. Many times there is some exudatate covering the tonsil, and at other times the crypts of the tonsils are filled with hardened caseous material. Often this type of infection will occur frequently during the winter season, seriously interfering with school work and normal activity. Most of these young patients do better after removal of the tonsils and adenoids. This is not an assurance that there will be fewer or less severe "common colds," but usually it is a help in avoiding incapacitating illness.

Enlargement is usually not in itself sufficient grounds for operation, although in about 20 years of practice I have seen one child whose tonsils became so enlarged during an attack of acute tonsillitis that a tracheostomy became necessary until the infection and edema subsided enough for a tonsillectomy to be done.

The Adenoid Problem

The chronic mouth breather who is obviously short of breathing space in the posterior nasopharynx should by all means have the adenoids removed before the condition has gone on long enough to produce disfiguring "adenoidal facies." It is my feeling that unless the patient is very young, the tonsils should be removed at the same time to avoid having to undergo operation later.

The Tonsil after Acute Disease

Often after scarlet fever or measles (rubeola), especially after scarlet fever, there is enlargement of the tonsils, and they may remain infected after the disease itself has subsided. These youngsters almost always need tonsillectomy. The same condition of the tonsils is seen after streptococcal sore throats, especially if there has been repeated infection.

No discussion of tonsils and the need of tonsillectomy would be complete without consideration of the relation of tonsils to rheumatic fever. It was shown during World War II that there were areas of the country where outbreaks of scarlet fever and of streptococcal sore throats were common. The rheumatic fever rate was the highest also in these areas. It was difficult to prove any direct relation between scarlet fever or tonsillitis and rheumatic fever in given patients; however, there was no doubt that in those areas where the incidence of streptococcal infection was high the rheumatic fever rate was also high. From my own personal clinical observation I feel that removal of the tonsils in susceptible persons will help prevent rheumatic fever by preventing recurring streptococcal tonsillitis. However, the indications for operation in a child with rheumatic fever should be the same as for any other child. That is, if the tonsils are a source of trouble, they should come out. This operation certainly should not be done during any period of acute activity of the rheumatic fever.

The Common Cold

Severe or repeated "common cold" is no reason for tonsillectomy unless the tonsils are in bad condition. There are many parents who come into the office with a child and want a tonsillectomy because he has frequent colds. These parents will be disappointed if they think that tonsillectomy is the cure-all for the common cold. The management of such a child should be approached from many different directions. A child who is losing time from kindergarten or school in the first grade often seems to develop an immunity that

gives him more freedom from respiratory infection as he progresses in school.

The child with poor nutrition who fails to gain weight may do very much better after removal of the tonsils and adenoids if there has been infection in these tissues. Before the operation all other possible causes of the nutritional or growth failure should be investigated. These would include anemia, intestinal parasites and even some low-grade thyroid inactivity.

Otitis Media and Cervical Adenitis

Acute catarrhal otitis media, which may or may not go on to acute purulent otitis media, may be a recurring condition in a child. This condition is an indication for the removal of offending adenoid tissue which may be obstructing the outlet of the eustachian tubes. After such a procedure recurrence of the ear infection is usually avoided. The major problem with which the physician is concerned is a degree of deafness accompanying the infection. This hearing loss may persist and even become permanent if proper precautions for the avoidance of such infections are not taken. Temporary measures such as shrinking nose drops are a great help. The infections may be kept under control and the deafness improved or obliterated with the use of nose drops containing one of the sulfa drugs over a period of time.

Cervical adenitis following tonsillitis is commonly seen and may be persistent and difficult to manage. This is definitely an indication for tonsillectomy. Nose and throat cultures should be done for identification of the offending organism. Sensitivity tests to the various drugs and antibiotics may be a help. After this if there is not sufficient response to medical treatment, one may see no more of the offending adenitis after removal of the tonsils. By all means a tuberculin test should be done to rule out tuberculosis. Given a positive tuberculin test, further investigation should be done in an effort to rule out infection elsewhere before presuming that a tonsillectomy might stop all future involvement of the cervical glands. Infectious mononucleosis should also be ruled out when the cervical glands are enlarged whether or not there is obvious nose and throat infection.

The allergic child presents a complicated problem when infected and enlarged tonsils also enter the picture. In order to get lasting results the problem of allergy must be approached from such angles as desensitization and avoidance of allergens. Some allergic children are definitely improved after the tonsils and adenoids have been removed, but they are usually those children who are also having repeated infections in this area in addition to their allergies.

AGE AND TIME FOR TONSILLECTOMY AND ADENOIDECTOMY

Tonsillectomy and adenoidectomy should be performed before three years of age in only rare instances. Many children who have had adenoids removed at an earlier age seem to persist in having trouble in the posterior nasopharyngeal area. They compensate for the absent

adenoid tissue by hypertrophy of the lymphatic tissue. It would therefore seem the wiser course to temporize with medical treatment until an older age. By then operation may be unnecessary.

The problem of acute tonsillitis and inflammation of the adenoids is most pressing during the period from four to eight years, although it is not limited to these ages. After this time nature steps in with a gradual reduction in the size and importance of these tissues. If the number of acute infections can be held to a minimum during these years, the child may not need to have operation.

Some children who have had repeated respiratory infections and who have had the tonsils removed at an early age may show some regrowth of tissue. This may be severe enough to require surgical excision, though it can be dealt with medically in most cases.

During the winter months when measles and scarlet fever are most prevalent care must be taken to avoid operation in a child exposed to one of these diseases. The time for operation should be postponed until this is over. Serious complications could occur if the postoperative period were to be accompanied by one of the exanthematous diseases.

Tonsillectomies should be avoided during the summer months because of the greater frequency of bulbar poliomyelitis following operations in the nasopharyngeal region. The widespread use of poliomyelitis vaccine has diminished this danger greatly. There are still cases occurring, however, even after adequate vaccination has been given against poliomyelitis.

THE SURGICAL PROCEDURE

Although some may consider that tonsillectomy is minor surgery, it is my opinion that any operation which requires a general anesthetic is never "minor." Therefore great care must be used in selecting a surgeon and in preparing the patient for operation.

The otolaryngologist should be consulted when operation is contemplated, and one should obtain his opinion as to whether operation is indicated. He should have ample time to become acquainted with the young patient and the parents and to carry out the necessary preliminary laboratory tests and prescribe whatever preliminary medication he wants for that particular child. The otolaryngologist and the pediatrician should cooperate as a two-man team in readying the patient for the operation.

The surgeon should be informed of any special problems which the child has that might affect any phase of the surgical experience. Under the heading of special problems would come such things as epilepsy, congenital heart disease, inactive rheumatic fever, chronic pulmonary conditions or kidney disease. They should have whatever special preparation is necessary before hospital admission.

The surgeon should select the anesthesiologist—one with whom he is accustomed to working.

Preliminary drug therapy should include such drugs as penicillin given before and after operation in the congenital heart cases needing

tonsillectomy and in the rheumatic subject. The child with epilepsy may need to be given larger doses of his anticonvulsant than usual before and after operation. Vitamin K is often given by mouth for the week preceding operation. This should be arranged by the nose and throat surgeon.

It has been my practice to have a preliminary x-ray of the chest done in those children who have been particularly susceptible to respiratory infections. Bleeding and clotting times, as well as hemoglobin determinations, should be routinely performed before tonsillectomy. A family or personal history of any bleeding tendency is of great importance. Urinalysis should always be done. These things should preferably be completed during the week preceding hospital admission.

HOSPITALIZATION

If operation is scheduled for the morning, the child should be admitted the evening before so that he may have time to get used to hospital routine. He may be admitted early on the same morning if the operation is to be done in the afternoon. In preparing the young patient for the hospital experience it is well to let him know that tonsillectomy may be done at some time in the near future. It is often unwise to tell him the exact anticipated date, but may be well to wait until the day of admission to let him know that he is going in. The parents should be encouraged to stay with the child intermittently after admission until such time as they would be in the way. He should be reassured that they will be near while he is asleep and will be there with him as soon as he is awake again.

Preliminary medication should include a mild sedative on the night before admission and again before leaving home on the day of admission. The drug of choice for this is either phenobarbital or Butisol in dosage appropriate for the age of the child. Further preliminary medication should be at the discretion of the surgeon and the anesthesiologist.

The choice of anesthesia should be left to the operating team. There has been considerable discussion about endotracheal against insufflation anesthesia. In the hands of the experienced anesthesiologist the advantages of the endotracheal technique include the more positive control of the patient's airway with the ability to assist spontaneous respiration to aid in the maintenance of normal blood oxygen saturation, the removal of carbon dioxide, and the prevention of aspiration of blood and debris from the adenoids or the tonsils. Endotracheal techniques allow a wider range of anesthetic agents, and patients can be carried in lighter planes of anesthesia with consequently more rapid recovery.

POSTOPERATIVE CARE

In the postoperative period patients recovering from tonsillectomy and adenoidectomy are difficult to manage. A recovery room is essential.

The patient should be placed on his side and in the Trendelenburg position. The increased secretion from the mouth and pharynx, and the blood which is frequently seen in the posterior pharynx, are more easily removed.

After operation when the patient has been returned to his room and is fully awake, he should be encouraged to take fluids by mouth. Only mild sedation should be used, and if there is considerable pain, this should be controlled with salicylates or small doses of codeine. Except in complicated cases the patient is usually ready to return home the day after operation. He should not be allowed to return to school until two weeks after operation. During this recovery period it is important to watch for hemorrhage, and the surgeon should be called at once if this occurs. It usually requires this two-week period for the child to regain his appetite and begin feeling really well again.

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ACUTE UPPER RESPIRATORY TRACT INFECTIONS

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The most common illnesses of children are the acute upper respiratory tract infections. Fortunately few are serious, and most of them are self-limited. Serious infections and complications are relatively unusual. Nevertheless since there are so many upper respiratory tract infections, serious sequelae are frequently seen.

Most of these infections involve the entire upper respiratory tract, and it is unusual to find complete localization. For this reason I think it is wise to consider these infections from an etiologic standpoint rather than from an anatomic one. Another reason for "thinking etiologically" rather than anatomically is that successful therapy is mostly predicated upon a correct etiologic diagnosis. A correct etiologic diagnosis has become especially important since the advent of antibiotics and chemotherapeutic agents. Therefore the following sections are arranged so that these infections may be better considered from an etiologic viewpoint. The anatomic concept will not be abandoned, but will be referred to when appropriate.

VIRAL INFECTIONS

The study of viral upper respiratory tract infections may be historically divided into two periods. The first period was one of clinical observation, augmented by the occasional use of animals as experimental hosts. The second period is the present one of extensive virus isolation and identification. The advent of the techniques of tissue culture marked the end of the first period and the beginning of the second. The improved methods of isolating new viruses have become so productive that the state of understanding of many viruses is now in a state of flux. They are the so-called orphans, viruses searching for a disease. In short, studies in vivo have lagged behind studies in vitro.

The Common Cold

Although promising work is being done, the cause of the common cold remains unknown. The most difficult clinical problem is that

of diagnosis. In the infant this is often very difficult, since most respiratory illnesses in this age group begin with the symptoms of coryza. This may explain the common but unfounded belief that colds are often complicated by bacterial infections. The truth of the matter is that in these cases the coryza is merely the earliest symptom of the bacterial infection.

Antibiotics are certainly valueless if the epidemiologic pattern, the physical findings and the course of the disease are indicative of a cold. Small infants experience difficulty with a "stopped-up nose." They will neither sleep nor feed very well until the nasal airway is open. The use of a nasal aspirator is often helpful. The parents should be cautioned to compress the aspirator bulb *before* inserting the tip into the nostrils. One or two drops of twice normal saline solution (½ teaspoonful of salt to 4 ounces of warm water) dropped into the nares before use of the aspirator may be helpful. Judicious use of 0.25 per cent phenylephrine nose drops may also be of value.

Adenoviruses

The adenoviruses were first isolated by accident from adenoidal and tonsillar tissue while attempting to use these surgical specimens as the cellular components of a tissue culture system. More than 20 antigenic types of adenovirus have been identified as probable causes of disease in upper respiratory tract infections. The one which is most commonly seen is acute exudative nonstreptococcal pharyngitis or tonsillitis. Types 1, 2, 3 and 5 adenoviruses have all been implicated. This disease tends to mimic streptococcal sore throat very closely. Generally speaking the patient with adenovirus exudative pharyngitis is not as sick as the patient with a streptococcal pharyngitis. The tonsils tend to be larger; there is less pharyngeal involvement; the exudate is thinner, whiter and more streaked; and the tonsillar nodes are not so large or tender. The white blood cell count is usually elevated slightly, but not as high as with most streptococcal infections. There is a tendency to periodic recurrences with these adenovirus infections. Although generalizations of the clinical pattern may be made, there is no practical way to differentiate virus sore throat from that which is due to the streptococcus except by culture. For a discussion of the technique of throat culture see the sections on Streptococcal Infections and Office Bacteriology.

Adenovirus type 3 has been found to be the cause of pharyngeal-conjunctival fever. Adenoviruses 4 and 7 are the cause of an acute, diffuse, febrile respiratory illness which is apparently limited to military recruits.

Enterovirus

The best known among this large family of viruses is poliovirus. The portal of entry of poliovirus is the nasopharynx, and a mild febrile upper respiratory tract illness is the rule during the prodrome of either

clinical or abortive poliomyelitis. There are no characteristic features of the respiratory illness associated with poliomyelitis.

Group A Coxsackie virus is an enterovirus which does produce a characteristic clinical pattern. It is the cause of herpangina. This febrile disease usually occurs in the summer and generally follows an epidemic pattern. One of the characteristic features of the illness is the occurrence of vesicles on an erythematous base on the soft palate. The disease is self-limited.

Group B Coxsackie virus has been reported as the cause of a non-specific pharyngitis.

There have been over 20 types of ECHO (enteric cytopathogenic human orphan) viruses isolated. As with all the enteroviruses, the portal of entry is the nasopharynx, so that a mild respiratory illness is to be expected during the prodrome of many of the clinical infections with these viruses. In fact, types 8, 10 and 20 ECHO viruses have been found in association with severe diffuse upper respiratory tract infection with gastroenteritis.

Other Respiratory Viruses

Influenza is classically associated with severe upper respiratory tract symptoms such as those which occur in measles. The prodromata of measles, because of the variability, may easily be mistaken for any of several of the other upper respiratory tract infections.

Rubella will frequently cause a redness of the throat. The enanthem of chickenpox often involves the pharynx. The aphthae of primary herpetic gingivostomatitis will occasionally involve the tonsils and pharnyx in such a way that it may be difficult to distinguish this disease from exudative pharyngitis.

STREPTOCOCCAL INFECTIONS

The only streptococci of clinical importance which occur as infecting agents in the upper respiratory tract of man are those belonging to group A. Beta hemolysis of red blood cells in vitro is an almost constant property of group A organisms, and only rarely will group C or group D produce this phenomenon. A practical method of differentiating group A from the other groups producing beta hemolysis is discussed in the section on Office Bacteriology. It is therefore apparent that the terms "group A" and "beta hemolytic" are almost synonymous.

The group A streptococcus is responsible for a considerable number of acute upper respiratory tract infections in man. There are 44 recognized types of this group, and each of these types produces a specific immunity. Thus an infection with one type, such as type 14, will confer no immunity to another type, as for example, type 19. This is apparently the explanation for recurrent streptococcal infections.

The severe streptococcal infections such as scarlet fever are usually promptly recognized and adequately treated, but mild acute and sub-

acute infections frequently go unrecognized. This is especially true in younger children. For this reason the milder infections probably now result in more serious complicating illnesses than the treated severe infections. It is generally accepted that from 1 to 6 per cent of all cases of untreated or inadequately treated streptococcal pharyngitis will produce rheumatic fever in those persons who have never before had it. The incidence is even higher in those who have previously had an attack.

Pharyngitis

The classic clinical pattern features a rather sudden onset of fever followed shortly by a sore throat. Vomiting is common. A headache and, especially in older children and adults, myalgia are fairly frequent occurrences. The severity may vary from the mildest of symptoms to prostration.

The appearance of the tonsils and pharynx may also vary widely. There may be only a slight scattered redness without exudate, or the entire pharyngeal area may be diffusely and brilliantly red with large patches of exudate. The palatine arches may be red, and petechiae on the soft palate are not uncommon. Late in the course of the disease the redness will often be confined to the pharyngeal lymphoid tissue, and there may be a small area of thin yellow exudate in the center of each part. Occasionally the patient will complain of unilateral discomfort, and inspection will reveal only unilateral involvement of the throat. Frequently there is a tender tonsillar lymphadenopathy. *The clinical picture may show striking variations.* In fact, in most cases there is no readily available clinical means for differentiating streptococcal sore throats from viral ones. Fortunately, the choice is limited to only these two causes. For practical purposes, no other bacterial agent will cause acute pharyngitis. Therefore the single most reliable method of determining whether a sore throat is of viral or streptococcal origin is the bacterial throat culture.

The specimen is taken with a sterile cotton- or Dacron-tipped swab. The swab should be wiped rather vigorously across the areas of greatest exudate, on each tonsil or fauces and into the area posterior to the uvula and soft palate. Smaller children should be in a supine position on the examining table with the arms immobilized. It is important to use a tongue blade and to have a good light. The swab should then be immediately inoculated into the culture medium. The chance for growing the streptococcus may be greatly decreased if the swab is allowed to stand for even a few minutes. The medium should be allowed to warm to room temperature before the specimen is taken. The techniques of media preparation and determinative bacteriology for office use are discussed in the section on Office Bacteriology.

A white blood cell count and a differential white blood cell count may also be helpful in arriving at a correct etiologic diagnosis. There may be considerable "overlap," however, in the lower counts which may occur in streptococcal infections and the many higher counts present with viral pharyngitis.

When to give definitive treatment and when to withhold treatment is often the most difficult decision. In all cases when there is reasonable doubt as to the etiologic diagnosis, and the patient is not very ill, I

feel that it is definitely better to wait until the results of the culture are available. The twenty-four hours are usually time well spent. Occasionally an overanxious parent will make that time hectic. Treatment should be given as soon as the culture is taken if the patient is very ill and there is little doubt about the diagnosis, or if the patient obviously has scarlet fever.

There is no doubt about the correct treatment if the patient does have a streptococcal sore throat. Penicillin is the drug of choice. Continuation of the treatment for 8 to 10 days is imperative. Aqueous procaine penicillin G, 300,000 units once daily for 10 days; penicillin G or penicillin V orally, from 150,000 to 300,000 units every 6 hours for 10 days; or 600,000 units of procaine penicillin G with 2 per cent aluminum monostearate in oil every third day for a total of 3 injections, are all adequate for eradication of the streptococcus from the pharynx and for the prevention of rheumatic fever. The most widely used drug and probably the one of choice is benzathine penicillin, or Bicillin. One can maintain blood levels for 10 days with a single injection of 600,000 units to the patient under 60 pounds or 900,000 units to the patient over 60 pounds. One disadvantage is the high incidence of severe local reactions. This can be overcome by the use of combinations of procaine penicillin and benzathine penicillin. When this combination is used (still giving 600,000 units of benzathine penicillin), the incidence of severe local reactions is no higher than when procaine penicillin alone is used.

For the rare pediatric patient who is allergic to penicillin, erythromycin is the drug of choice and, again, should be given for 10 days.

The patient with scarlet fever is much less likely to be overlooked by the family than the child without the rash. There are mild cases which can be mistaken for rubella or certain cases of exanthem due to ECHO virus infection. Here again a throat culture is often invaluable in differentiation. The treatment of scarlet fever is the same as that for streptococcal pharyngitis.

Suppurative Infections

Acute otitis media due to the group A streptococcus is generally indistinguishable from acute otitis media caused by other organisms. The patient tends to be somewhat sicker. The onset is usually more rapid. There is a greater frequency of rupture of the ear drum with subsequent drainage of infected fluid. The pharynx may or may not appear involved. A throat or nasopharyngeal culture will often grow the organism, but it is not always possible to culture the streptococcus when there is only an acute otitis media. If there has been rupture of the ear drum with seropurulent drainage from the external auditory canal, a small sterile swab can be used to obtain a specimen for culture. This fluid will grow the organism in pure culture. The treatment is the same as for streptococcal pharyngitis.

The group A streptococcus is not the sole cause of acute *cervical adenitis*. Adenitis, however, is so often caused by this organism that it is best considered streptococcal. Many times it is difficult to distinguish

acute adenitis from acute adenopathy, especially if there is a coexisting acute otitis media or quinsy. The pharynx usually appears normal. The white blood cell count is helpful in the differential diagnosis; it will often range between 20,000 and 40,000. A throat culture will often grow the group A streptococcus even if the pharynx does not appear involved. Larger initial and maintenance doses of penicillin than those used with streptococcal pharyngitis are necessary for treatment. Incision and drainage are indicated if suppuration of the node occurs after adequate penicillin.

Retrotonsillar and *peritonsillar abscesses* are almost always due to the streptococcus. Dysphagia and dysphonia are strikingly constant in addition to the usual symptoms of a streptococcal pharyngitis. There may be redness and exudate only on the involved side, since the disease is usually unilateral. Cultures should be taken from that side. Other suppurative complications of the streptococcus are frequently present; e.g. acute otitis media and acute cervical adenitis. The treatment is by administration of penicillin. One should give larger doses than are used in pharyngitis, and the duration of treatment should be more prolonged. Failure to respond may indicate that the abscess needs to be incised and drained.

Streptococcosis

A streptococcal respiratory infection in infants does not usually tend to localize. Instead, it produces a chronic diffuse upper respiratory tract illness. There may be fever. The infant is usually irritable, feeds poorly, and fails to thrive. Cervical lymphadenopathy may be pronounced. The nares become excoriated and crusted, and there is a constant, thin serosanguineous nasal discharge. A culture of this fluid will yield a pure growth of group A streptococcus. The term "streptococcosis" has been proposed for this clinical condition. Penicillin is the drug of choice just as it is with all other streptococcal infections.

PNEUMOCOCCAL INFECTIONS

The commonest bacterial infections of the upper respiratory tract are those due to the pneumococcus. This organism is the cause of acute otitis media in at least half of the cases in which the cause can be identified. The pathogenesis of pneumococcal infections is well understood, but it is a mystery why the organism may remain in the nasopharynx in the carrier state for considerable periods of time and then suddenly exhibit virulent properties. In certain situations pneumococcal infections will spread in a contagious manner in almost epidemic patterns. At other times the same antigenic type will constitute the normal bacterial flora of the nasopharynx. Pneumococcal infections, unlike many of the other upper respiratory tract pathogens, are limited to no particular age group. This is probably due to the number of antigenic types, which, like the streptococcus, produce type-specific immunity. In addition to the classic types I, II and III, group IV contains 77 recognized types.

This probably, in part, explains why the pneumococcus causes disease at all ages.

In the upper respiratory tract there is a tendency for this organism, after the initial invasive symptoms of coryza, to produce localized suppurative lesions; e.g. acute otitis media and acute sinusitis. The latter infection is of course much less common in childhood. Pneumococcus does not cause pharyngitis. In small infants a chronic illness, similar to streptococcosis, is frequently seen. The term "pneumococcosis" might well be applied to this condition.

The nasopharynx is the site of choice for obtaining a specimen for culture of the organism. This can be done most easily by immobilizing the younger child in a supine position and gently passing a small sterile swab on a thin flexible wire through the nostrils into the nasopharynx. This should be allowed to remain in place for 20 seconds. The specimen should be immediately inoculated to the culture medium. Culture of infected fluid draining from the middle ear will usually grow the organism in pure culture.

Penicillin is probably the treatment of choice. Sulfonamides are also effective. Unresolved suppurative lesions, especially of the paranasal sinuses, may require drainage. Simply finding the organism without any real evidence that it is causing disease is no indication for treatment.

HEMOPHILUS INFLUENZAE INFECTIONS

Upper respiratory tract infections with this organism tend to be more widespread than infections with the other bacterial agents. It is not at all unusual to see conjunctivitis associated with acute otitis media. The pathogenesis is such that the organisms and the infection spread easily from the nose and nasopharynx by way of the nasolacrimal duct to the conjunctival sac and through the eustachian tubes to the middle ear. Another favorite site of involvement is the larynx. Hence acute otitis media, conjunctivitis and laryngitis occurring simultaneously are suggestive of an infection due to *Hemophilus influenzae*. Fortunately there are only six recognized antigenic types of this organism, and most of the clinical infections are limited to types A and B. Because there are so few antigenic types, an infection due to this organism is rare after the age of four or five years.

The best site for obtaining a specimen for culture of this organism is probably the conjunctival sac. The infant or small child should be immobilized in a supine position and a sterile swab placed gently but firmly against the punctum of the inner canthus. The lids should be held open while the swab is in position. The specimen should be plated immediately. Another excellent site for obtaining a specimen for culture is the nasopharynx. The technique for obtaining a nasopharyngeal specimen is described in the section on the pneumococcus. The growth and identification of *Hemophilus influenzae* are described in the section on Office Bacteriology.

The treatment of choice for these infections is chloramphenicol. It is probably best to reserve this drug for the more serious infections, since resistance to therapeutic agents develops quickly. For the less severe infections sulfonamide drugs seem desirable. Recurrences of infections due to *Hemophilus influenzae* are frequent.

OFFICE BACTERIOLOGY

The first step is setting up a bacteriology laboratory in the office is to decide what organisms you will want to isolate and identify. From the foregoing sections it is apparent that the most important single upper respiratory tract pathogen which needs to be identified by culture in office practice is the group A streptococcus. Next is the pneumococcus and then, to complete the list, *Hemophilus influenzae*. The streptococcus requires blood to grow. Human blood, because of streptococcal antibodies, is not as dependable as sheep or rabbit blood for the growth of group A streptococcus. Rabbit blood is expensive and difficult to obtain. Also, *Hemophilus hemolyticus* or *Hemophilus* X grows so readily on rabbit blood that it is a constant source of confusion in the colonial identification of group A streptococcus. Therefore sheep blood is the most desirable blood to use for culture of the group A streptococcus. Trypticase soy agar is an excellent nutrient agar for this organism.

The following supplies and equipment are needed for office culture of the streptococcus:

Equipment (necessary)
- Incubator
- Platinum wire loop and straight wire
- Burner, gas, Bunsen
- Glass-marking pencil

Equipment (desirable)
- Microscope
- Autoclave
- Magnifying glass (large reading type)

Supplies (necessary)
- Petri dishes, 100 mm., plastic, disposable (Falcon Plastics, Los Angeles)
- Sheep blood, sterile, defibrinated (Markham Laboratories, Chicago)
- Trypticase soy agar (BBL, Baltimore)
- Sterile applicator swabs, cotton- or Dacron-tipped

Supplies (desirable)
- Glass microscope slides
- Large and small pyrex test tubes (for preparing sterile swabs)
- Gram-staining solutions with plastic bottles and droppers
- Taxos-A-discs (BBL)
- Taxos-P-discs (BBL)

From the list it can be seen that the only really expensive items of equipment are the autoclave and microscope. These are not absolutely essential, but are usually present in most offices. With the exception of the incubator, the remainder of the supplies and equipment are inexpensive and can be purchased from local medical supply houses or hospital equipment companies. An incubator can be expensive, but an excellent small model is available for about 75 dollars. If expense is a concern, a plywood box utilizing a 40-watt frosted electric bulb as a heat source works satisfactorily. The bulb should be in the bottom of the box, separated from the Petri dishes by two perforated shelves. A thermostat is needed in the box. It is wired into the electrical circuit of the bulb.

Preparation of Media

The trypticase soy agar is added to distilled water in a 4 per cent concentration. It is first melted into solution by boiling, then autoclaved. The melted agar is then cooled to 50° C., after which the defibrinated sterile sheep blood is added. A concentration of 7.5 per cent blood agar seems to work better for me than the usual 5 per cent. The plates will darken if the blood is added before the agar is sufficiently cool.

In the event that media preparation is undesirable, prepared sheep blood agar can be purchased from Hyland Laboratories, Los Angeles, California, in sterile packs of 3 plates, 50 cents per plate. The cost of the materials for the plate prepared in the office is 8 cents.

Inoculation and Streaking

The specimen for inoculation should be swabbed onto the surface of the plate in an area approximately 4 by 1 cm. Sterilize the wire loop by heating. Allow it to cool and streak the first half of the plate. Rotate the plate, and without further sterilization of the wire loop streak the third quadrant. Proceed in the same manner to the fourth quadrant (Fig. 13). Utilize all of the plate. It is a waste of good plates to streak haphazardly and to use only a small area.

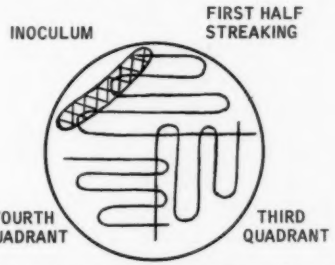

Fig. 13. Streak the plate in a systematic manner, proceeding from the inoculum and the first half, to the third quadrant and then the fourth quadrant.

Identification of Organisms

The group A streptococcus grows readily upon sheep blood agar. Incubate for 24 hours at 37° C. The colonies will be 0.5 to 1.0 mm. across, slightly rounded, smooth, white and opaque. They will be surrounded by a zone of sharply delineated complete hemolysis. The more isolated colonies are usually larger than those crowded into the area near the inoculum. In most instances the diagnosis of beta hemolytic streptococcus can be made from the colonial appearance. Much time can be saved from making and staining smears for microscopic morphology. The best way to become acquainted or reacquainted with the colonial appearance of the beta hemolytic streptococcus is to spend some time "reading plates" with an experienced bacteriologist.

Some group C and occasionally group D streptococci will produce hemolysis. Differentiation from group A can be achieved by the use of bacitracin-impregnated discs, supplied as Taxos-A discs. The disc is placed upon a subculture of the organisms, but no zone of inhibition will be present if the streptococcus is group C or D.

The pneumococcus grows readily upon sheep blood agar, and after 24 hours' incubation at 37° C. the colonies are 1 to 2 mm. in diameter, flat, smooth, and translucent with a smooth, circular, slightly raised border. Alpha or green hemolysis of the blood cells gives the colony a greenish color. If there is any doubt of the diagnosis from the colonial appearance and uncertainty as to whether the organism is pneumococcus or alpha hemolytic streptococcus, then an excellent rapid method is available for differentiation. Taxos-P discs on subculture will selectively inhibit the pneumococcus, but will not inhibit the alpha hemolytic streptococcus. This test is far superior to the bile solubility test in inexperienced hands.

Hemophilus influenzae grows poorly upon sheep blood agar. There are several ways of overcoming this difficulty when one is considering the organism. A few chocolate agar plates can be made when the medium is prepared by pouring the plates at 100° C. before cooling. The organisms will grow nicely upon this medium. Another method is to subculture staphylococcal colonies onto the sheep blood agar plates to provide the missing factors X and V necessary for the growth of *Hemophilus influenzae* and promote satellite growth. When this is done, one can see a heavy growth of smooth, circular, rounded 0.2- to 2.0-mm. transparent colonies immediately surrounding the staphylococcal colony. A large magnifying glass is of inestimable help in studying the colonial characteristics of any of the organisms for identification and picking colonies for subculture.

Only the barest essentials for an office bacteriology laboratory have been described. There are many modifications and elaborations that can be made. Nevertheless the system as described does work well. The greatest advantage lies in the fact that it is within the immediate control of the clinician. The hospital laboratory or the laboratory miles away only reports the growth. The culture is a living part of the patient and cannot be removed from the patient and the disease under consideration. Finally, the greatest value is not the many practical advantages that accrue, but the satisfaction of knowing instead of guessing.

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NOISY BREATHING

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Noisy breathing is a fairly common complaint of infants seen in pediatric office practice. The precise diagnosis is sometimes difficult, but even so the prognosis is usually excellent, and treatment often consists of little more than reassurance.

My discussion will be limited to noisy breathing in small infants only, since it occurs more frequently in this age group and the approach to the problem is somewhat different than it is in older children. I would define the breathing as consisting of loud, harsh breath sounds, inspiratory or expiratory or both, with or without more or less generalized rhonchi, and with or without tactile fremitus.

THE PROBLEM

The problem, as is often the case in pediatrics, is usually one of decision as to whether the condition is serious or not. Is the noisy breathing a manifestation of some disorder which you must actively attack and do something about, or is it something which time will correct and in which delay carries no danger?

BENIGN TYPE

Perhaps it would be expedient to dispense first with the typical nonserious type. A typical case is that in which the mother remarks about the condition at the first routine check-up at four to six weeks of age. The infant is afebrile and otherwise seems well and healthy. Unlike the sound associated with congenital laryngeal stridor, for instance, this benign type of noisy breathing is not heard at birth, an observation which might make one suspect that it has to do with the onset of salivation. Newborns secrete little saliva.[2]

The breathing tends to be louder when the infant is tense or excited and decreases or is absent during sleep. It is worse when the infant is supine and also during feedings. It often improves when the infant is held in a sitting position. Auscultation over the nose and mouth may

be of some help in diagnosis by indicating that any sounds you hear upon auscultation over the chest are transmtited there from the upper air passages. Furthermore, there is no sternal or intercostal retraction.

About the time the infant begins to sit alone this benign type of noisy breathing begins to subside and has usually disappeared completely by the time he is walking. One might attempt to explain this on the basis of posture and drainage due to gravity. It could be theorized that the child previously did not swallow his secretions for some reason or other, but has now matured to the extent that he does. At any rate, spontaneous correction is so predictable that the mother can be confidently reassured during the early difficult days.

Young infants, during the first two or three months of life, sometimes have a type of noisy respiration which seems to be due to some obstruction at the back of the throat. It is heard while the infant is asleep, but is not the noise of a snore. It is said possibly to be due to vibrations produced by the soft palate, but I have never been able to demonstrate this in clinical practice.[1]

RULING OUT SERIOUS CONDITIONS

If the noisy breathing is something indicative of serious disease, it would be a disorder which is causing more or less obstruction in some manner at some level. Physical examination will probably not give normal results. Certain findings would make one suspect serious disease such as retraction, cyanosis, increased respiratory rate, chest deformity, abnormalities as indicated by auscultation of the chest and perorally, "crowing," and so on. In the newborn, for example, the fact that there is serious trouble may be quickly evident. The cause of the trouble may not be so obvious. A part of the examination should include the passage of a catheter into the nostrils to rule out choanal atresia. Such systemic diseases as amyotonia should be kept in mind. Retractions and "crowing" may quickly make you aware that laryngoscopy is in order, but without some such reasonable indications this procedure is probably unnecessary. Even then, however, if x-ray studies are inconclusive, laryngoscopy or even bronchoscopy may be indicated, depending upon your clinical judgment.

Infants with cerebral damage at birth may have noisy breathing and frequently drool unduly as they become older. Otherwise most noisy breathing that is serious will be associated with a disorder directly involving the respiratory system.

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CROUP

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Patients and parents are justifiably frightened by the symptoms of croup. The hoarseness, inspiratory stridor, barking cough, dyspnea and sternal retraction should cause grave concern in the attending physician.[2] Improper evaluation of a case of croup may result in disaster. Management of the case depends on many factors. Usually the first report of the symptoms is by telephone. Definite advice should be given before seeing the patient.

ADVICE IN EMERGENCY CARE FOR FIRST ATTACKS

Make sure there is no history of aspiration of foreign body such as nipple, pacifier, small toy or vomitus. Then get the patient into an atmosphere of high humidity *immediately*![1] This can conveniently be done by having one of the parents take the child into the bathroom, close the door and turn on all hot water faucets. The other parent can make preparations for continuous high humidity. (1) Start water boiling in a vaporizor, in a pan on an electric hot plate or in an electric coffee maker (this should be in a small room). (2) Drape the crib with a sheet so that moisture will be concentrated in this area. (3) Bring the patient from the bathroom only after high humidity has been achieved inside the croup tent. Tell the parent that excitement often aggravates the spasm and that quiet, reassuring behavior around the child is important. A physician should not belittle the potential seriousness.

Medications are usually of secondary importance, but they do have something more than psychologic effect. There is no harm in giving a previously prescribed cough medicine. If they have SSKI or other iodides, these may be helpful. A small dose of equal parts of honey (or corn syrup), lemon juice and whisky seems effective in temporarily quieting the cough. In the meantime make definite arrangements to see and examine the patient in the home, office or hospital as soon as possible.

MANAGEMENT OF CASE AFTER EXAMINATION OF PATIENT

Spasmodic Croup

The patient is usually between two and five years of age. The onset is usually sudden and in the middle of the night. There may have been no preceding illness, although possibly a mild cold was present. Often the child was chilled or had been abnormally active. There may have been a change in the weather. There may be a family history of croup.

Moisture, rest and expectorants may have quieted the symptoms dramatically by the time the child is examined. There may be a nasal obstruction with slight redness and edema of the pharynx. If crying or struggling causes suprasternal, intercostal or subcostal retraction, it should be pointed out to the family that this is a warning sign. If there is retraction at complete rest, hospitalization is indicated. Inability to sleep or rest is also a warning sign.

Treatment such as that outlined in the second paragraph should be continued. High humidity, expectorants and rest are important. Symptoms may recur towards evening if the onset was earlier in the day. Re-evaluate the case.

FUTURE ATTACKS OF SPASMODIC CROUP

Each attack should be reported and checked by a physician, since it may be due to a different cause. Recurring attacks up until the age of four or five years are common. Chilling should be avoided. Upper respiratory tract infections or weather changes may trigger an attack. It is wise to anticipate attacks and start "treatment" before symptoms develop in much the same manner as already outlined.

CROUP ASSOCIATED WITH OTHER DISEASES

The stridor, cough and respiratory distress may be associated with bronchiolitis, acute laryngitis, laryngotracheobronchitis, asthma, foreign body, diphtheria and severe upper respiratory tract infections. Hospitalization is obviously needed immediately for some of these. If there *may* be need for oxygen, special laboratory work or surgical intervention, it is better not to procrastinate, but advise hospitalization. If parents are excitable, irresponsible or not too cooperative, it is dangerous to trust them with such a nursing task.

HOME CARE

Home care of these potentially serious diseases places a heavy burden on the physician, but a man with good judgment can attempt it under the following conditions: (1) history of previous attacks with uneventful recovery; (2) the patient is not toxic; (3) there is no inspiratory retraction when the patient is at rest; (4) the patient is over six months of age; (5) the parents are calm, observant and coopera-

tive; (6) there is no air hunger; (7) history and examination preclude the diagnosis of diphtheria or foreign body; (8) weather, roads or streets would permit immediate transfer to a hospital if indicated.

Laryngotracheobronchitis is usually better treated in the hospital, but care at home has some advantages other than economical. Familiar surroundings help to allay fear and apprehension, permitting the patient to rest better. Dyspnea naturally increases with activity. It may console the parents to know that more treatment is available if needed. They should know that oxygen may become necessary and that this may necessitate hospitalization. The possible need for a tracheostomy should be discussed when the time seems appropriate. This usually reassures rather than frightens the parents.

ORDERS GIVEN PARENTS

The child should be kept quiet at all costs. He should be kept in a croup tent constantly except that his mother might hold him while sitting in a rocking chair under a canopy with high humidity. The patient should be kept comfortably cool, and his clothing should be changed when it becomes saturated. The patient should not be taken in and out of a room with high humidity.

One should try to keep the nostrils open so that mouth-breathing will not dry the mucus in his throat. Nose drops may be used every four to six hours. Normal feedings should be offered, but not forced, and fluids should be offered frequently.

If fever is present, aspirin may be given in doses of 1 grain per year of age, every 4 to 6 hours. Since *Hemophilus influenzae* is a common cause of a severe form of croup, it is rational to give Chloromycetin in doses of 20 mg. per pound per day. Penicillin is indicated if there is evidence of pyogenic infection. Expectorants with antihistamines, iodides such as SSKI, and Benylin expectorant or elixir of Benadryl may be used. Sedation, though to be desired, may be dangerous at home. Sedative action associated with Benadryl may be satisfactory in this respect. ACTH and the corticosteroids were popular, but it is now felt that their value is limited. Great caution is practiced when they are used outside the hospital for any cause.

Call a physician and prepare for hospitalization if any of the following is noted: (1) retraction when not struggling or crying; (2) inability to sleep (watch for rolling of the head from side to side as if in search of air); (3) increased irritability and restlessness; (4) increased fever or toxicity; (5) fatigue or other duties preventing the parent from giving full time to the patient.

MANAGEMENT AFTER RECOVERY

Parents should provide rest, moist air, an expectorant and close observation whenever there is evidence of an upper respiratory tract infection in the patient or members of his household. Self-treatment with left-over antibiotics is more to be condemned here than in any other case.

SUMMARY

Although the seriousness of laryngotracheobronchitis decreases after two years of age, it is always potentially dangerous and should always be seen by a physician. Air hunger, sternal retraction, fatigue and toxicity are reasons for hospitalizing regardless of age.

Just as the associated etiologic agents vary in various reports, croup may be associated with epidemics which vary in intensity, duration and response. There is no place for complacency in the management of croup.

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EVALUATION OF HEART MURMURS IN CONGENITAL HEART DISEASE

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As more congenital heart defects are attacked successfully by surgery, the evaluation of cardiac murmurs in infancy and childhood takes on increasing importance. This is especially true since approximately half of all children before adolescence exhibit at some time an "insignificant" murmur. In the outpatient dispensary of the Louisville General Hospital a survey revealed that 41 per cent of the noncardiac children exhibited such a murmur.

THE HISTORY

Usually a strong suspicion of the cause of any murmur may be reached by an adequate history. The prenatal history may suggest the possibility of a congenital lesion, as certain teratogenetic effects cause congenital heart defects, as well as other congenital deformities. Notable among this group is the finding of a congenital heart lesion in the "rubella syndrome," but certainly any untoward infection or accident during the early months of pregnancy should be viewed suspiciously. The family history is rarely helpful, although adequate studies along this line are not available. At present a few observations[3] have suggested that there is a six times greater chance for a child with a sibling with congenital heart disease also to have congenital heart disease.

Since cardiac lesions may cause physical retardation, the parent's evaluation of the patient's growth and development, particularly in relation to his siblings, should be a part of every history. There is no indication, however, that any cyanotic lesion by itself causes mental retardation. Certainly no mother should ever be led to believe that successful correction of a congenital heart lesion will in any way affect the mental capacity of her child.

A history of repeated upper respiratory tract infections is most

suggestive of a left-to-right shunt. Cyanosis and cyanotic spells, of course, in themselves point to a congenital heart lesion. Interestingly enough, several patients have been referred to the Children's Heart Clinic in Louisville because of "spells." Simple questioning about these spells has indicated that these were typical epileptic attacks with an aura, followed by tonic and clonic convulsions, loss of consciousness and loss of bladder control.

A history of excessive sweating and easy tiring on exertion, or during bottle feeding in infancy, should make one suspicious of a congenital heart lesion. Just as important, absence of these findings in the history should point to the strong possibility that this may be a clinically insignificant murmur with which you are dealing.

THE PHYSICAL EXAMINATION

Here the physician may confirm many of the signs noted during history taking. A prominent active precordium, bulging of the precordium, a palpable thrill, obvious cyanosis and clubbing, and an enlarged heart will indicate the presence of a congenital heart lesion. The presence of other congenital defects, particularly hypertelorism, should make one suspect an associated defect of the cardia.

Evaluation of the murmur itself is, of course, important. In the presence of cyanosis, a thrill or obvious cardiac enlargement, particularly after x-ray examination, a murmur is never "insignificant," and the patient should be referred to a pediatric cardiologist.

The physician, however, is usually faced with a child whose history and physical examination are noncontributory except for a soft, blowing, basal systolic murmur. This murmur may suggest an atrial septal defect, particularly if the second sound in the pulmonic area is accentuated and widely split. The constancy of this splitting of the second sound in both inspiration and expiration is a valuable sign, as well as the constancy of the murmur in several different positions during examination.

DIAGNOSIS OF SPECIFIC CARDIAC LESIONS

Although several variations from the classic forms noted by Maude Abbott[1] in her original classification are known to occur, the differentiation into cyanotic, acyanotic and potentially cyanotic groups is of definite benefit to the clinician. The majority of cyanotic lesions are tetralogy of Fallot, transposition of the great vessels, tricuspid atresia or truncus arteriosus. In these lesions the murmur itself may be of little help in specifically classifying the patient (Table 7).

Except for coarctation of the aorta, which can be easily diagnosed by differential pressure between the lower extremities and the right upper extremity, and aortic stenosis, acyanotic lesions are mostly of academic interest (Table 8).

The potentially cyanotic lesions are difficult to diagnose and are the most important, since all are being successfully corrected by surgery.

TABLE 7. *Common Cyanotic Lesions*

DEFECT	HISTORY	EXAMINATION	CHEST X-RAY	EKG	COMMENT
Tetralogy of Fallot	Early onset Cyanosis Squatting	Type and presence of murmur may vary from patient to patient Clear P_2	Clear lung fields Heart shadow may be boot-shaped	RVH	Most common of group
Transposition of great vessels	Early cardiac difficulty	Precordial bulge Large heart may have a thrill Murmur not helpful	Large heart Moderate to serious over-circulation	RVH	Second most common
Tricuspid atresia	Early onset Cyanosis	Type and presence of murmur may vary from patient to patient Clear P_2	Clear lung fields Heart shadow may be boot-shaped	LVH	EKG diagnostic
Truncus arteriosus	Cyanosis may be minimal	Large heart with precordial bulge May have thrill Murmur varies	Heart enlarged with normal circulation or over-circulation	RVH	No surgical aid available

RVH: right ventricular hypertrophy.
LVH: left ventricular hypertrophy.
CVH: combined ventricular hypertrophy.

TABLE 8. *Common Acyanotic Lesions*

DEFECT	HISTORY	EXAMINATION	CHEST X-RAY	EKG	COMMENT
Coarctation of aorta	Headaches Numbness of legs Failure in infancy Possibly asymptomatic	Hypertension in right arm and hypotension in lower extremities	May be normal Later notching	Normal or left ventricular hypertrophy	Possibility of associated lesions of aortic valves
Aortic stenosis	May be asymptomatic Later unexplained fainting	Classic thrill and harsh systolic murmur in right 2nd intercostal space	May be normal or show evidence of left ventricular hypertrophy	Normal or left ventricular hypertrophy	Surgery not too successful Patient liable to sudden death
Uncomplicated dextrocardia	Asymptomatic	Heart pulsation and sounds to right of sternum	Heart shadow on right	Typical	No treatment necessary
Endocardial fibroelastosis	Early unexplained congestive failure, but may be delayed	Large heart No murmur usually	Large globular heart	Normal or left ventricular hypertrophy	May respond to digitalis at first Prognosis poor
Anomalous coronary artery	Early trouble (by 4 to 6 months)	Not too helpful	Heart may be normal in size	Typical anterior myocardial infarction pattern	Surgery has been attempted with little success
Glycogen storage disease of heart	Familial May have muscular weakness	Large heart Macroglossia	Large heart May be in failure	LVH or CVH	Muscle biopsy may be diagnostic Prognosis poor
Primary myocarditis	May have family history of virus disease	Large heart	Large heart	Variable pattern	Probably not truly congenital

For this reason the suspicion of any of these lesions necessitates a baseline evaluation by a pediatric cardiologist. The most common signs and symptoms are listed in Table 9.

EXPLANATION TO PARENTS

Parents may need to be approached differently about the presence of a murmur in their child. Generally the physician should explain to the parents the presence of the cardiac murmur in a precise, honest manner. If it is his feeling that this is an "insignificant" murmur, then the parents should be so informed. They should be urged to have the child examined yearly until his fifth birthday. If the physical growth and development is normal and there is no cardiac enlargement, cyanosis or palpable precordial thrill, the child may be safely observed. If the murmur persists until school age, a baseline evaluation would be desirable. This should include a chest x-ray and electrocardiogram. It is essential for these to be interpreted by a physician thoroughly familiar with congenital heart disease. Depending on the interpretation of these, referral to a pediatric cardiologist may be indicated. In any event, such a child should be seen by a pediatric cardiologist when he reaches his tenth birthday. If during the period of observation a specific diagnosis is suspected, referral for further evaluation of the patient's over-all status and the advisability of surgery should be discussed with the parents.

When the child exhibits a prominent precordium, thrill, cyanosis and clubbing, or cardiac enlargement, the parent should be told that operation, either at present or in the future, is a distinct possibility. The necessary further examinations, and the determination of the advisability of operation and the time when it should be performed, should be determined by consultation with a pediatric cardiologist.

The parents should be quickly relieved of any feeling of guilt on their part, or any need for oversolicitation toward the patient. In general a child with a congenital lesion will "set his own pace," so that no specific precautions about activity need be taken. Overheating, dehydration (especially in patients with cyanotic heart lesions) and competitive athletics in older children should be avoided. The parents should be encouraged to see that their child receives his necessary immunizations. These may be given at the usual time, with the usual precautions.

The prophylactic use of antibiotics has been overdone. They should certainly be given to any cardiac patient who is to have a dental or surgical procedure. The value of their daily use, however, is questionable.

SPECIAL INSTANCES

The murmur of a patent ductus arteriosus, because of its characteristic machinery-like quality,[2] is readily diagnosed. Since patients with this lesion do not necessarily have other signs or symptoms previously

TABLE 9. *Common Potentially Cyanotic Lesions*

DEFECT	HISTORY	EXAMINATION	CHEST X-RAY	EKG	COMMENT
Patent ductus arteriosus	May be asymptomatic	Typical machinery murmur	May be normal or show left ventricular enlargement as well as atrial enlargement	Normal or LVH	Presence with or without symptoms indication for operation
Atrial septal defect (secundum)	Neonatal cyanotic spells Asymptomatic Mild growth failure	May have precordial bulge Soft blowing systolic murmur in 2nd left intercostal space Split P_2 louder than A_2	Normal or prominent pulmonary artery segment	Incomplete bundle branch block May also reveal RVH	If symptomatic at any age, operation indicated
Ventricular septal defects	Asymptomatic	Harsh murmur in 3rd and 4th intercostal spaces to left of sternum	Normal	Normal	Good prognosis
	Early growth failure Repeated respiratory infections	Murmur as above with thrill and precordial bulge	Enlarged heart Left ventricular enlargement and overcirculation	LVH CVH RVH	Surgery
Pure pulmonary stenosis	May be asymptomatic May tire easily	Precordial bulge Thrill in 2nd and 3rd intercostal spaces to left Stenotic type of murmur here with radiation to left shoulder	Normal May have poststenotic bulge of pulmonary artery Circulation normal to under	RVH	If symptomatic at any age, operation indicated

mentioned, it should be noted that the occurrence of this murmur is an indication to refer the patient for surgical correction of the defect. Most cardiac surgeons prefer to operate on these when the child is about three years old.

The newborn period is probably the most difficult period in which to evaluate murmurs. In general the louder and earlier a murmur is heard, the more likely is this to disappear and to be of no significance. Murmurs of congenital lesions usually do not make their appearance until the third day or later, and often are not heard until the sixth-week checkup. Of course the occurrence of heart failure, as at any age, necessitates immediate treatment and evaluation.

SUMMARY

Cardiac murmurs may occur in as many as half of all children before the age of adolescence. Correct evaluation of such murmurs depends on the history as well as the physical examination. Although the chest x-ray and electrocardiogram may be of definite help in the evaluation of cardiac murmurs, they should be interpreted by a physician well acquainted with such studies in children. The constancy of any murmur at several different examinations is the single most important characteristic of an organic murmur. The occurrence of heart failure, cyanosis, precordial thrill or cardiac enlargement indicates the need for referral, but a child who is asymptomatic except for his precordial systolic murmur may be safely observed until 10 years of age. The obtaining of a chest x-ray and electrocardiogram on the latter patient at five years of age is desirable.

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BRUISING AND BLEEDING

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When a physician is confronted with a perplexing problem, he usually arrives at a diagnosis through an orderly work-up. Thus he first takes a detailed history, then does a complete physical examination and finally does such laboratory work as seems indicated. Laboratory tests may be kept at a minimum or may be needed only to confirm the suspected diagnosis if the history and physical examination are thorough. This plan should certainly be followed in any child who presents with bleeding or bruising. The cause will frequently be found to be nothing more than the result of normal play. In a few cases something serious, such as leukemia or hemophilia, will be found. We shall outline the manner in which the symptom of bruising or bleeding may be handled in the office with a minimum of laboratory procedures and expense.

HISTORY

The presence of bruising or bleeding will often be brought to the attention of the physician in an off-hand manner during a visit for some other condition. Frequently the parent will casually mention that the child's nose bleeds several times a week or that he seems to have a lot of bruises on his legs—"more than other children." A few other facts should be determined before dismissing the condition as "normal for his age."

The age of the patient and duration of the finding are important. Congenital forms of purpura usually appear in early infancy. Idiopathic thrombocytopenic purpura is more common before six years of age. Trauma is a common cause of bruises in the toddler. Circumstances associated with the onset are important. A preceding illness, the start of football practice or too energetic cleaning of the nose may account for the symptom. Dietary history may reveal a deficiency of vitamin C with resultant scurvy. A history of pica may give a clue to the possible ingestion of some toxic substance which has produced a hemorrhagic tendency. An allergic history may suggest anaphylactoid

purpura. Finally, a family history of easy bruisability or excessive bleeding may indicate the possibility of such diagnoses as hemophilia, pseudohemophilia or congenital hemorrhagic telangiectasia.

PHYSICAL EXAMINATION

During the physical examination one should pay particular attention to the nature and distribution of the lesions. "Normal" bruises due to trauma are usually located over points of contact, particularly the extremities and forehead, and will be found in various stages of resolution. They are frequently seen when the child is learning to walk and during those times when he plays most actively. The outline of these bruises is usually irregular and indistinct in contrast to purpura, which is usually sharply defined. The specific configuration of the distribution of petechiae is often important. On numerous occasions petechiae have been found to be caused by some constricting article of clothing such as a garter. In two patients in our experience a strange, circular area of petechiae on the forehead was found to be due to the suction produced by a toy arrow with a suction-cup tip which had been pressed against the forehead.

If there is active bleeding to the surface, one should attempt to observe the actual bleeding point. Slight oozing of blood in the mouth may be produced by a small laceration of the frenulum of the upper lip and may persist for days. Oozing from the gums may be produced by scurvy, leukemia or some toxic agent. Nosebleed usually occurs in the anterior nares, and occasionally there will be definite evidence of trauma. Repeated nosebleed may be the only symptom of thrombocytopenia.

Joint swelling should be investigated for the presence of blood. If blood is present and is associated with no history of injury or only a minor one, there may be a coagulation defect.

Coexisting infection may be present in such conditions as sepsis and Rocky Mountain spotted fever. However, there may be fever and no infection in anaphylactoid purpura or leukemia. Lymphadenopathy and hepatosplenomegaly, if present, may be significant. The stool and urine should be observed for blood and examined for traces not visible grossly.

LABORATORY STUDIES

There are numerous laboratory procedures available for determining many of the specific factors involved in the coagulation mechanism. A "blood work-up" is frequently requested without first determining whether there is a true involvement of either the blood-coagulating mechanism, the platelets or the vascular system. The following procedures are usually of most value in deciding which of the mechanisms is involved:

Tourniquet Test. This test will determine whether or not there is increased capillary fragility, and it may also indicate a platelet de-

ficiency. A blood-pressure cuff is applied to the upper arm and kept inflated slightly above the diastolic pressure for five minutes. The test is positive if a large number of petechiae appear below the cuff in a few minutes.

PLATELET COUNT. An examination of a stained blood smear is usually sufficient to determine whether or not adequate platelets are present. A true count is difficult for the unskilled examiner and may give misleading information. If the platelets are decreased, a bone marrow examination should be done to determine the presence or absence of megakaryocytes. By the same examination one will diagnose or rule out leukemia.

PROTHROMBIN TIME. This is always prolonged if there is defect in any of the factors involved in the prothrombin mechanism. There may be no prolongation of the clotting time unless the deficiency is great. If the prothrombin time is prolonged, one should seek further help from the laboratory or hematologist in an effort to determine the particular factor involved.

PROTHROMBIN CONSUMPTION TIME. In the hemophilias the prothrombin consumption time is prolonged. This test is more reliable than the clotting time, which may be within the wide range of normal even in the presence of the disease.

A bleeding time, as it is usually performed, is of little true value and may be misleading or may give the physician a false sense of security.

SUMMARY

The child who has bruising or bleeding should be examined with a plan of procedure in mind. Such a plan has been outlined and discussed. The physician should be able to determine the cause of the trouble or reach a diagnosis if he pays careful attention to details, noting both positive and negative findings. He cannot hope to convince the parent that there is no major disorder until he himself is certain that there is no major lesion. It is obviously unnecessary to perform all the tests on each patient. Only the history and physical examination are necessary most of the time.

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IRON DEFICIENCY ANEMIA AND ITS THERAPY

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Lack of adequate iron in the diet is by far the most common nutritional deficiency of early life today. The age distribution of iron depletion is rather striking. The majority of patients are between the ages of 9 and 30 months. They are seen almost daily in an active pediatric practice. The anemia, that of iron deficiency, is the same whether it results from inadequate intake or from actual blood loss.

IRON REQUIREMENTS

The high incidence of iron deficiency is principally attributed to the rapid growth rate. This results in increased needs for iron. Other etiologic factors include faulty diet, defective maternal stores of iron, prematurity, blood loss, absorptive defects as in steatorrhea or chronic diarrhea and other diseases.

The amount of iron stored in the body tissues of infants and children is surprisingly small. After the first three months of life the rapidly growing infant is dependent upon a constant supply of exogenous iron in order to maintain normal iron metabolism. The greatest absorption and need for iron occurs during the first three years of life, when growth is most rapid. The need for iron decreases between the ages of 4 and 10 years. Growth is slower then. The need increases, however, during adolescence, a period when growth is again rapid.

THE CLINICAL PICTURE

The four common manifestations of severe anemia are pallor, irritability, anoxia, and decrease in normal activity. The infant with severe anemia is usually an unpopular member of the family. Even the most solicitous attention fails to satisfy him. He lies fretfully in his crib, refuses his diet, and is interested only in drinking milk. Height and weight are usually within normal limits, and obesity is more common than

underweight. In severe anemia the spleen may be enlarged, and a soft, blowing apical systolic murmur may be heard. Pica is not uncommon and usually disappears when the deficient diet is corrected.

LABORATORY FINDINGS

Laboratory study reveals the hemoglobin and hematocrit levels to be reduced. The number of erythrocytes is normal or may be slightly reduced. They are microcytic and hypochromic with anisocytosis and poikilocytosis. The reticulocyte count and serum iron level are low, while the serum level of iron-binding protein is elevated. Bone marrow examination reveals a hyperplasia of the late normoblastic elements with inadequate hemoglobin in their cytoplasm. Leukocyte and platelet elements and their precursors are normal.

DIETARY MANAGEMENT

The normal diet of the infant, with solid foods introduced at two months of age, will supply enough iron to meet the calculated needs during this period of most rapid growth. But relatively little extra iron is available for the premature, the twin or the infant who has lost blood and whose demands for iron are increased. The availability of readily prepared strained foods has simplified the feeding of infants. The prepared formulas have made better feeding very simple as compared with the major problem it presented three decades ago. Iron is now added to strained cereal and to breads. Certain milk formulas also contain iron. The amount present is not great enough to consider it therapeutic when actual anemia already exists, but it will certainly help to supply the need for exogenous iron and aid in preventing anemia.

Before treating the patient with microcytic hypochromic anemia one must be sure that the condition is one of simple iron deficiency and not something more serious. One must rule out absorptive defects and chronic blood loss, for instance. Since this deficiency often results from a faulty diet, the parents must be educated. Milk should be limited to 1 pint or less daily. The intake of such starchy foods as potatoes, crackers, spaghetti, bread and cookies should be decreased. They should be replaced by foods high in iron. In exceptional cases, when the mother is unable to change the child's dietary habits, hospitalization may be necessary. There, under firm but sympathetic care, the diet can be changed.

OTHER TREATMENT

It seems unnecessary to say that the treatment of iron deficiency anemia is with iron, but the statement is in order. The practicing physician is offered more than a hundred preparations for the treatment of microcytic hypochromic anemia. Only a few of these are simple

iron preparations, while the others are combinations of various drugs. Since iron can be assimilated from a variety of foods, some form of oral, rather than parenteral, supplementation is best. Our own attention is now directed toward finding some medicinal food form of added iron suitable for routine use in infants and children. The reduced iron salts or ferrous salts are absorbed more readily than the ferric salts. Ferrous sulfate or ferrous gluconate is most commonly used. The daily intake of iron for therapeutic purposes should be 100 to 200 mg. of elemental iron or 300 to 600 mg. of ferrous sulfate.

Ferrous sulfate is the most common preparation available, and the tablet (0.3 gm.) or the syrup (0.2 gm. per 5 ml.) is given 2 or 3 times daily. Ferinsol contains 125 mg. per milliliter. Two or 3 ml. should be given daily. The initial doses of these drugs should be about one fourth of the therapeutic dose and increased slowly over a two- or three-week period. Medication should be given in three divided doses, since iron is absorbed slowly. Iron should be given just before or after meals, thus reducing the amount of gastric irritation. Liquid preparations of iron may be taken through a straw and the mouth thoroughly rinsed afterward to prevent the tongue and teeth from becoming coated and darkened with iron sulfide.

There seems to be little rational basis for the frequent combination of vitamins and other minerals with the iron salts. Vitamin B_{12} and folic acid are almost never required in the treatment of iron deficiency anemia. If their inclusion is based upon an uncertain diagnosis or the possibility that the patient may have pernicious anemia or some other disease, then the multiple preparation is to be even more condemned, for such therapy is not adequate. Cobalt, copper, dilute hydrochloric acid and other complements of the multiple hematinics are not necessary and add an unnecessary expense.

If the patient fails to show improvement, one must consider that the anemia is not due to dietary iron deficiency. Complicating factors or disease may be preventing a bone marrow response, or perhaps there is continued blood loss. It may be that the medication was simply not taken, or, rarely, there may be impaired absorption of iron.

When oral iron cannot be tolerated or whenever an emergency situation arises in which quick replacement is necessary, parenteral iron may be given. Transfusion with red blood cells is the most rapid means of replacement, but carries certain hazards. Even with modern laboratory techniques transfusion reactions are still common. Also, sensitization to other blood types and factors is a distinct possibility. Other complications include febrile reactions to pyrogens, toxic reactions caused by bacterial contamination during collecting or storage, homologous serum hepatitis and allergic reactions to injected allergens or reagins in the blood of the donor. The amount of blood given in a transfusion should vary with the individual patient and with the problem. Transfusion in small infants should not exceed 10 ml. per pound of body weight, though this amount may be repeated after a few hours. The possibility of precipitating cardiac failure or pulmonary congestion by increasing the blood volume should be kept in mind.

During recent years another parenteral iron preparation, an iron dextran (Imferon), has been used extensively. This preparation is currently off the market in this country, pending further study. Personally, I believe that within a short time iron dextran will be available again. It is an excellent preparation which is safe and easy to administer. This type of therapy may be completed within a few days and is not influenced by diet or household problems. Iron dextran as compared with whole blood transfusions and other parenteral iron preparations effects no anticoagulant activity, no acute or chronic toxicity and no antigenicity and has no cardiovascular effect. The parenteral solution contains 50 mg. of iron per milliliter, and in anemic persons 75 per cent or more may be utilized immediately. There is little danger of producing hemosiderosis or hemochromatosis because of the wide margin of safety of the drug. The dosage is based upon an estimate calculated from a formula which accompanies the drug:

$$\text{Dose of iron} = (13.5 - \text{actual hemoglobin}) \times 2.5 \times \text{weight in kilograms}$$

SUMMARY

A brief review of the possible causes of iron deficiency anemia and of the physical and laboratory findings in the patient has been presented. The causes and findings may vary, but only iron is essential in treatment. Whenever possible, oral therapy is best. The use of simple iron preparations, rather than combinations of iron with unnecessary minerals, vitamins and other substances, is satisfactory and economical.

Whenever iron cannot be taken or retained orally or cooperation of the parents is poor, parenteral iron must be given. Whole blood transfusions should be avoided unless absolutely essential. An excellent parenteral preparation has been iron dextran (Imferon). This substance is now off the market, pending its further study, but it has been, and will undoubtedly continue to prove to be, an excellent preparation for the treatment of iron deficiency anemia.

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INFANTILE COLIC

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In the first few months of life the infant who cries excessively is often said to have colic. The term itself simply means "pertaining to the colon," and colic is often considered to be caused by spasmodic contractions of the gastrointestinal tract. When we consider the various conditions under which excessive crying occurs at this age, many of us still feel that it may often be of an emotional rather than a primary gastrointestinal origin. What are these conditions which lead to so much crying?

HUNGER

We are all familiar with the screaming infant who is promptly relieved when his bottle is given him and have all had the personal experience of being hungry ourselves. Our own feelings at such times have been those of apprehension and unhappiness with a sense of emptiness in the abdomen, a certain mental distress and physical incapacity. We may not have been in pain, but we still experienced immediate relief of our uncomfortable feeling upon taking a quickly absorbable liquid food. These symptoms of hypoglycemia certainly do not include severe abdominal pain. Similarly the relief of hunger crying of infancy is obtained by giving adequate food, being sure that the nipple holes are large enough for the infant to get the food out of the bottle.

ALLERGY

The crying associated with allergy usually comes after consuming the offending allergenic food. It is usually accompanied by vomiting and diarrhea and the passage of large amounts of flatus. If allergy is suspected, a milk substitute such as Sobee should be given. Results will be spectacular if your suspicions are correct. The infant will experience immediate relief and stop crying. There is nothing psychogenic about allergic colic, and physicians should always consider milk allergy early in the presence of persistent gastrointestinal upset and crying. Similarly, other foods may cause the same symptoms, and elimination diets are

most helpful in the management. Skin tests, however, are not very valuable in the study of any of these cases.

HYPERTONIA

The cause of hypertonia is not clearly understood. Hypertonia is easily recognized, however—the tense muscles, the hyperactive reflexes, the wide-open eyes, the frequent outbursts of loud screaming without obvious cause. It may or may not be relieved by food, sedatives, cuddling or enemas. Hypertonia is an inherited characteristic, one or both parents often being hypertonic. The condition is worse in first-born babies when the parents' nervous condition is aggravated by ignorance, inexperience and anxiety. It is a well known fact that the nervous mother transmits her nervous tension to her small infant in some way. The parents of hypertonic infants are pitiful and deserve the greatest patience on the part of their physicians. They spend one sleepless night after another rocking and walking their infants. They try too hard.

All kinds of sedatives may be administered to the infant. One may try such things as elixir of phenobarbital, 1 teaspoonful in water every 3 or 4 hours as needed at night; elixir Donnatal, 5 drops in water 10 minutes before feeding; Piptal pediatric drops, 1 dropperful (1 cc.) in water every 2 or 3 hours; syrup of Atarax, 1 teaspoonful in water 4 times daily. All these drugs can be used as long as they seem beneficial, but drug relief is usually not too satisfactory.

One remedy often works temporarily. It may be necessary to put the infant in a hospital where the mother cannot touch him, but can see him through the ward window and observe what goes on. He will eat and sleep like a normal infant. The reason for this change in the child's personality is the calm, nerveless, impersonal and objective attitude of the professional nurses who care for him. Parents of these patients will often object to hospitalization, however. It may take a lot of persuading to sell the idea. Various diagnostic tests as indicated may be mentioned for their psychological effect. After the infant has been in the hospital for several days for observation it can be brought home.

After a day or two these infants usually begin the excessive crying again. What, then, has been accomplished by the hospitalization? The physician has convinced himself of the fact that the diagnosis of simple hypertonia is justified. Thus fortified with increased confidence, he can assure the parents that there is nothing seriously wrong and that the condition will improve in time, sedatives perhaps being needed occasionally. He may also tell the parents that the baby has been born with a nervous constitution and that he may always be somewhat nervous. The physician can console the parents, however, with the information that many infants are born this way and that they learn to adjust themselves to the world as they get older. As a temporary, although expensive, expedient, the employment of a calm, experienced practical nurse to live in the home and take complete charge of the infant is helpful.

GROWTH AND MATURATION

During the early maturation process the infant has a peculiar type of crying which is most frightening and annoying to the parents, although it is a crying habit which is present in about 60 per cent of normal infants. He will eat and sleep and be perfectly peaceful for about 20 hours and then for 4 hours will scream and pull his legs up as if in terrific pain. This screaming period comes at the same time day after day, the most common time being from 6 to 10 p.m., although it may come between 12 midnight and 4 a.m. or even at any other period. It stops when the infant is between three and four months of age.

What could explain this screaming that recurs at such regular intervals and stops at three to four months of age? I can think of no body dysfunction that could explain it. I believe that it is a phenomenon of the maturation process, and I doubt whether the infant is in any actual pain. Furthermore, there is no treatment that stops this periodic screaming. If it occurs at 12 midnight to 4 a.m., a sedative can be given an hour or so before the expected period, thereby putting off the disturbance to a more convenient hour. It is from this phenomenon that the term "three-months colic" derives.

EXCESSIVE SUCKING DEMAND

Infants are born with a well developed sucking reflex. In some infants this reflex is developed to such an extent that they have to be sucking upon something all the time. Otherwise they cry. Fortunately condemnation of the pacifier is decreasing, and the pacifier is once again being accepted in polite society. It has a useful place. I recently saw a two-month-old infant who was being grossly overfed. The mother could not stop the infant from crying except by giving a bottle of milk. The infant was vomiting and having loose stools. This situation was corrected by prescribing a normal amount of food and giving a pacifier between times. Other causes of severe crying can be found in infancy just as in older children—e.g. otitis media, hernia, intussusception—and careful examination must be made to rule them out.

SUMMARY

Considering the five most common causes of excessive crying—hunger, allergy, nerve tension, maturation phenomenon and unusual desire for sucking—is the crying due to physical pain or to emotional disturbance? I think that we find elements of both in all five types. I feel sure of one thing—the infants are usually not in as much pain as they appear to be or as their parents think they are.

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HERNIAS IN INFANTS AND CHILDREN

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Hernias are protrusions of intra-abdominal contents either through abnormally enlarged natural openings or through pathologic ones. The most common hernias are inguinal and umbilical.

Inguinal hernias in children are usually indirect, are much more common in boys than in girls, and are most often on the right side. According to Gross,[3] 90 per cent of them occur in boys, 60 per cent on the right side, 15 per cent bilateral, and 25 per cent on the left.

INGUINAL HERNIA

A quick embryologic review recalls that a peritoneal sac precedes the testicle as it descends from the genital ridge to the scrotum. The lower portion of this envelopes the testicle to form the tunica vaginalis. The remaining portion, or processus vaginalis, is usually atrophied by the time of birth. Since, however, this atrophy does not occur until late in the gestational period, this accounts for the increased incidence of inguinal hernias in prematures. Apparently some degree of hernial sac remains in a high percentage of males, and given a sufficient increase in intra-abdominal pressure, a hernia develops. Pertussis with paroxysms of coughing was at one time a common contributing cause.

The usual *history* is the development of a painless inguinal swelling which may vary in size and persistence. The hernia is frequently reduced while sleeping or with mild external pressure or with elevation of the foot of the crib.

Examination to confirm the *diagnosis* should first include inspection of the two inguinal areas for any evidence of bulging, although this may be difficult in the well nourished child. Added information may be obtained by gently "rippling" the fingers lightly over the inguinal area. Both the examiner's hands and the examining room should be adequately warm to prevent excessive reflex muscle spasm which may reduce effectiveness of the examination. In some cases all that may be demonstrated is the "silk glove" feel of the rubbing together of the two walls of the empty hernia sac. After crying in the infant, or after

standing or bearing down in the older child, the patient should again be observed for evidence of swelling. An occasional case may have to be diagnosed entirely on the history of swelling alone.

The *differential diagnosis* of an inguinal mass includes lymph nodes which are usually discrete and frequently multiple, hydrocele of the cord which is cystic and transilluminates well, and undescended testicle which may be moved along the canal and is associated with absence of the testicle in the scrotum.

Treatment for inguinal hernia is immediate operation. Essentially the only exception to this should be that which would contraindicate any type of operation. At the time of diagnosis it is important for the physician to spend a few minutes to inform the family of the condition. Without creating undue alarm one may make an explanation of reasons for immediate elective surgery. Families frequently ask whether or not he (or she) will outgrow this. The answer is that it may happen, but not in sufficient percentage of instances to warrant the risk of waiting. What about a truss? They are a parental nightmare, impossible to keep properly applied, and fail to retain the hernia most of the time. The possibility of incarceration must be mentioned. Acceptance of your recommendation is usually assured if you will be firm.

Incarceration is the most common *complication* of inguinal hernias in infants. McLaughlin and Coe[6] recently reported a series showing two thirds of incarcerations to be in infants under 3 months of age and 84 per cent under one year of age. No instance of strangulation was noted in these cases, however.

Incarceration may be treated by sedation, cold packs to reduce edema and swelling, elevation of the foot of the crib and gentle manipulation. If this is successful, the child should be closely observed until edema and swelling have subsided, and then surgical correction may be instituted. If this treatment does not relieve the incarceration, emergency surgery must be carried out with bowel resection if necessary.

Perhaps the most current controversy over surgical treatment of inguinal hernia in infants and children involves exploration of the opposite side. Rothenberg and Barnett[9] in 1955 recommended bilateral surgical exploration. They found evidence of a left-sided hernia in 25 of 33 patients with clinical right-sided hernias only. They also found right-sided hernias in 12 of 17 patients with a preoperative diagnosis of left-sided hernias only. Since this report Doctor Robert E. Gross[4] was asked to comment on this matter, and he concurred. The last available report is the one previously mentioned by McLaughlin and Coe.[6] In routine exploration of children under age three they find a 55 per cent incidence of hernia on the opposite side, the figure being 49.3 per cent if the initial hernia is right-sided and 69.6 per cent if the primary hernia is on the left side. Some surgeons in this field explore the opposite side only in cases in which the primary hernia is on the left or in which some thickness of the cord can be palpated. These treatment efforts are directed toward avoiding the necessity of a subsequent procedure.

UMBILICAL HERNIA

Umbilical hernia is the result of protrusion through the opening for the passage of the umbilical vessels. Some slight protrusion is common in many infants. Umbilical hernia is approximately twice as common in girls as boys, possibly because of the difference in muscular development. Such hernias are much more common in both sexes of the colored race and are less likely to regress spontaneously.

The presence of an umbilical defect may not be particularly noted until the infant begins to stand. Not infrequently the pressure for some attempts at correction first comes from the grandmother or some other relative reared in a time when abdominal binders were more in vogue for such purposes.

Defects of no more than 1 to 1.5 cm., and even larger when noted in the first year, will usually regress as the muscle wall strengthens and the normal diastasis of the rectus muscles disappears. Defects which are still more than 1 cm. after the first year of life are not apt to close so well.

Taping or other proper trussing does seem to speed the closure of certain of these defects. If used, taping should be done adequately by applying it well around the lateral abdominal wall and carrying it over the defect with sufficient constriction of the skin to cause some furrowing at the navel. This type of application minimizes the pull on any one area of skin, reducing irritation. Once applied, it should be left on until it seems to be no longer effective, and then new tape should be applied. A popular truss has a pad with a button projection which should *definitely not be used,* since it causes pressure on the fascial ring and tends to slow closure rather than promote it.

Operation may be electively performed as desired for the correction of persistent defects and should be done before the child enters school or at such time as the presence of the mass may be emotionally upsetting to the child. Correction in the female is perhaps more important because of the ultimate possibility of the strain of pregnancy.

OTHER HERNIAS

Epigastric hernias are defects located in the midline of the fascia between the umbilicus and the sternum. These defects do not close spontaneously and should be surgically corrected as desired.

Diaphragmatic hernias may be secondary to a congenital muscle defect or may result from traumatic rupture from sudden increased intra-abdominal pressure. They are seldom seen in office practice. Only one infant with this condition has been first presented in my office in 10 years. They may be symptomless for long periods and are frequently discovered at the time of examination for an intercurrent illness, frequently respiratory. Neonatal cases may cause acute distress, but of course they are not an office problem. The treatment is surgical.

Femoral hernias are rare in children. Their diagnostic points are equivalent to those in adults. Surgical correction is indicated.

Intra-abdominal hernias are usually manifest as an acute surgical condition of the abdomen with the diagnosis made or confirmed at laparotomy.

SUMMARY

Types of hernias seen in office practice of pediatrics are outlined with emphasis on the two more commonly seen—inguinal and umbilical. If there is one point to be made, it is the emphasis of immediate operation upon diagnosis for inguinal hernia in all pediatric age groups. Although this has been accepted practice in the larger clinics for some years, many practitioners have not been so impressed and have not recommended such for their patients. It is the confirmed opinion of this author that they should. In the young infant hospitalization is rarely for longer than 24 hours.

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ANUS AND RECTUM

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Of special importance to the examiner of children are the anatomic relations of the rectum, anus, sacrum and coccyx. In the adult there is considerable concavity of the sacrum and coccyx which causes a corresponding angularity of the rectum at the anus. In the child this concavity is relatively minimal, and there is nearly a straight-line relation of the rectum and anus. As a result of this anatomic relation the stress of defecation, crying and breath-holding is made directly downward on the anus, accounting for the frequency of prolapse and procidentia in the younger age group. The rectal mucosa is thinner and normally much redder than that of the adult.

The size of the stool of the child of one year of age or older indicates the use of adult-sized instruments and utilization of the index finger in digital examination. The little finger and pediatric-sized instrument should be used in the child under a year of age.

INSPECTION

The infant is most conveniently examined on his back with the knees held in flexion upon the abdomen by the mother or assistant. The older child is asked to kneel upon the examining table and then bend forward, placing the side of the face upon the table. In this position, gentle lateral pressure to the sides of the anus, reassuring comments to the child, and a request to strain as at stool may lead to relaxation of the sphincter and allow brief visualization several centimeters through the anus.

The presence of circumanal erythema suggests irritating feces, *Oxyuris vermicularis* infestation, antibiotic pruritus ani, mycotic infection or faulty hygiene, whether it be too little attention by the child or too vigorous wiping by the parent. More peripheral erythema accompanies ammoniacal diaper rash, detergent burns, and rubbing of a coarse diaper.

Cellulitis and abscess formation are apparent. Congenital or acquired fistulous openings may be more difficult to see. Multiple excoriations

and superficial fissuring may signify pruritus ani or congenital syphilis.

Congenital anal tags are frequently accompanied by fissures. Acquired anal fissure is the most common pathologic lesion of the anus. The location in the infant is usually lateral in contrast to the posterior position for the older child, a fact related to the angulation of the rectum in the latter.

The straining of the child may cause the appearance of prolapse or procidentia, or the expulsion of mucus, pus or blood.

Hemorrhoids are an uncommon finding in children, although internal hemorrhoids are often mistakenly diagnosed because of the normally reddened mucosa of the child.

PREPARATION FOR INTERNAL EXAMINATION

Psychological

The mother needs a brief explanation of the examination contemplated, with reassurance about pain and discomfort. The infant is helpful in that the procedure usually brings about straining.

The older child is told of anticipated discomfort, but he should be reassured that should pain occur, the examination will be interrupted. Compare the feeling to a need for defecation. Constant verbal assurances are needed during the examination. The asking of questions by the examiner makes the child feel that he is being a helpful participant. Tense children can be helped by administration of a tranquilizing drug several hours before examination.

Physical

Usually no preparation is necessary, especially for examination limited to the rectum and anus. The use of a cleansing saline enema or the prepackaged enema will evacuate fecal material, but may also wash away excretions of significance. The use of suppositories before visual examination is contraindicated because the coating imparted to the mucosa may obscure small lesions.

Digital

The patient lies on his back with the hips flexed. It is helpful for the buttocks to be elevated slightly on a low pad. The gloved finger is lubricated with warm water-soluble jelly. For the infant under one year the little finger should be used. Since the long axis of the ovoid anus runs anterior-posterior, the finger should be inserted so that the palmar finger surface is against the lateral anus wall. The insertion should be made slowly and with pauses until the sphincter has reached full relaxation. Once the anal canal is passed, the finger should be directed posteriorly to explore the curve of the sacrum. After palpation for obvious masses a bimanual examination should be made, the opposite hand palpating the lower part of the abdomen. Then the thumb,

apposing the examining finger, is used to palpate the perianal area in systematic clockwise fashion, searching for areas of tenderness.

PROCTOSCOPIC EXAMINATION

The anoscope or proctoscope may be successfully used without further preparation if the digital examination reveals an empty rectum. But if the rectum is full, an appointment for the next morning may be made. After the morning defecation a prepackaged disposable enema provides good cleansing for an examination several hours later.

The anoscope and proctoscope are the instruments of choice in young patients, since none but the highly experienced examiner should try to pass beyond the angulation of the sigmoid. As previously suggested, these instruments may be of adult diameter in children over one year of age.

The instrument is warmed and well lubricated with water-soluble jelly. After digital examination the sphincter becomes more relaxed and insertion of the instrument is facilitated. The instrument is pointed toward the umbilicus during insertion. The obturator is removed, and further advancement is made by visually following the lumen of the bowel ahead. It is well to keep in mind that the mucosa is very thin and that the peritoneal reflection is within ½ inch of the perineum in the infant. Pause at any sign of discomfort from the patient, and discontinue the examination if forceful restraint becomes necessary.

TREATMENTS

Anal stenosis of type I as described by Ladd and Gross is a relatively common finding in the young infant. Treatment consists in daily dilatations with progressively larger dilators until the index finger is admissible. The dilatations should be continued several times weekly for four months. If the stenosis is not so severe that an instrument has to be used for the initial dilatation, the mother may do the entire procedure at home, progressing from the tip of the little finger to the insertion of the index finger past the level of the distal interphalangeal joint.

Anal fissure, uncomplicated by cryptitis above or the presence of a sentinel pile below, usually responds to medical treatment. There are two objectives in children: (1) the maintenance of soft stools and (2) the relaxation of muscle spasm. The method of obtaining soft stools is largely a matter for the individual physician to decide, but harsh laxatives should be avoided because of consequent local irritation with its accompanying increased sphincter spasm. The application of moist heat, whether by compression or sitz bath, is universally accepted as the best means of reducing irritation and spasm. Further help can be had by application of a topical anesthetic, preferably in a solution. An ointment may tend to delay healing. Topical antibiotics in a water-miscible base will help to reduce inflammation of the contaminated fissure.

Prolapse and *procidentia* are treated acutely by wrapping the finger in tissue, inserting it into the lumen and gently guiding the mass back through the anus. The tissue is left in place as the finger is withdrawn. A ball of cotton is placed over the anus, and the buttocks are taped together. Sclerosing solutions to produce scarring and fixation should be injected only by the expert.

Symptomatic *cryptitis, papillitis* or deep *abscesses* should receive the care of a proctologist, since operation is ordinarily indicated. A superficial abscess may be opened, provided incision is wide and a drain is left in place for 24 hours.

Acute *pruritus ani* responds slowly to wet dressings and an oral antipruritic agent. Ointments are contraindicated. Tight underpants, pinworms and improper hygiene are common causes in childhood and should be corrected.

Fecal impactions are fragmented by pressing the mass against the sacrum with the examining finger. Enemas of mineral oil or saline solution are then normally sufficient to effect passage. The use of hydrogen peroxide as an enema for this purpose has been abandoned as a dangerous procedure.

ENEMAS

Since ancient Egyptian times the enema has been a fascinating tool of the medical healer. Through the ages the enema has been utilized for the removal of evil spirits, toxic gases and other supposed noxious substances. The present-day approach seems to be a more rational one utilizing the enema for these basic functions: (1) to cleanse and empty the lower bowel; (2) to reduce body temperature; (3) to administer fluids, electrolytes or medication.

The Cleansing Enema

The infant is placed on his back with the thighs flexed on the abdomen. The older child lies on the left side with the thighs flexed. The bedding is protected by plastic or rubber sheeting, or the bathinette may be utilized for the infant and the bathtub (warm, please) for the older child. It is convenient to elevate the buttocks on a pad so that a shallow basin can be placed under the anus to catch spillage.

The warmed and lubricated tube is inserted, with pauses, to a maximum of 3 inches. The flow should be nonforceful, and even small amounts should take at least one minute to instill. If possible, the open-funnel type of container should be used in combination with an appropriate-sized catheter (i.e. no. 14 to 24 French). Held at a level 18 inches above the anus, gravity provides a safe force to the instillation. If expulsion starts before the enema is completed, continue the flow until the return is clear. If distention takes place, cease the flow and encourage evacuation. Appropriate volumes of fluids for the various ages are 3 ounces at birth, 16 ounces at 4 years, and 32 ounces for the teenager.

There is a wide choice of ingredients for the cleansing enema. Tap water in sufficient quantity is the favorite. Instead of a soapsuds enema, if soap jelly (softened soap) is used to lubricate the tube for insertion, the anal canal is appropriately irritated to produce the defecation urge. Thus the irritating effect of a soap solution on the colonic mucosa is avoided by the use of clear tap water. As the enema is expelled, the soap is washed from the anus.

If prolonged enema irrigation is needed, saline solution should be used to avoid water intoxication or electrolyte depletion. Mineral oil aids in softening fecal matter and in lubricating its evacuation. The use of a wetting agent in the enema fluid has been of doubtful value in my experience. The prepackaged enema containing hypertonic phosphate salts is convenient to use and dramatically effective, but may give rise to considerable mucosal irritation. Do not use hydrogen peroxide as an enema fluid.

The Retention Enema

The technique is the same as for the cleansing enema except that a relatively small quantity of fluid is used (2 or 3 ounces for the infant, 4 to 6 ounces for the older child), and efforts are made to encourage retention. Retention is accomplished by rolling the child onto his abdomen as soon as the fluid has been instilled and holding the buttocks together for a few minutes.

The enema to reduce body temperature consists of normal saline solution at 50 to 60° F. This is the average temperature of city tap water in the winter. Normal saline solution is made by adding ¼ teaspoonful of table salt to 4 ounces of water.

Repeated retention enemas of saline at a three-hour interval are an effective means of administering fluids and electrolytes. Enteroclysis for the vomiting child or the sick child refusing oral fluids is often so successful that hospitalization for dehydration is avoided.

The use of an enema to administer a number of systemic medications is a well known procedure. Skimmed milk or starch solution used as a vehicle reduces the rectal irritation of many medicaments and increases the chance of retention and absorption. Starch solution is used as an emollient for an inflamed mucosa. Use one teaspoonful of starch for each ounce of water.

SUMMARY

Successful examination of the anus and the rectum of the infant or older child depends upon the development of proficiency in certain techniques. An understanding of the anatomic relations of the rectum, the anus and the sigmoid colon is important. Preparation for the internal examination is the key to success, culminating in endoscopic examination.

The techniques and local treatment of common anorectal disorders, as they are encountered in office practice, are discussed. The enema

still has a place in pediatric practice. Its use and technique of administration have been reviewed.

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DIARRHEA AS SEEN IN OFFICE PRACTICE

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The treatment of diarrhea in the nonhospitalized pediatric patient puts much responsibility on the physician. Success depends largely on his ability to judge the history and physical findings of the patient and to assess the intelligence and dependability of the family in carrying out instructions.

In cases of severe diarrhea with dehydration and acidosis the decision to hospitalize the patient is no problem, but in less severe cases the decision must be based upon the physician's judgment of the individual case. No experience in pediatric practice can give more insight into the family's intelligence and reliability than that which is gained while taking a diarrhea history. If a clear history can be obtained and the physical findings substantiate the story, it is likely that the family will try its best to carry out the physician's instructions in the home. If the physical findings are greatly different from what is expected to be found from the history obtained and if the parent cannot give a reasonable history as to the number of stools, their appearance and the interval between stools, it is likely that the family is going to be unable to carry out instructions. In these cases early hospitalization is best, particularly when dealing with small infants.

Treatment of the patient with diarrhea is largely determined by the cause of the diarrhea and the clinical status of the patient. The etiology of diarrhea is not always established in office practice, however, since it is not practical to obtain stool cultures on every patient presenting this symptom. All the agents which can be a cause must be kept in mind, since the presenting symptom of loose and frequent stools may be on the basis of enteric bacterial and viral pathogens, allergic factors, metabolic disorders, excessive ingestion of food and, in older children, emotional upsets and the injudicious use of laxatives. The occurrence of loose stools in association with the administration

of oral antibiotic and chemotherapeutic agents is not uncommon. Such diarrheas are usually terminated by discontinuing the medications.

DIARRHEA IN THE NEWBORN PERIOD

Any diarrhea occurring in the newborn period is of serious concern to both the parent and the physician. The gravity of true diarrhea in this age group cannot be overemphasized, since these infants have low resistance to infection as well as a small fluid and electrolyte reserve. These infants quickly become listless and have fever, and only a few watery stools will deplete the body reserve of electrolytes and water. Pathogenic strains of *Escherichia coli* and viral pathogens are most frequently responsible in the most serious of the diarrheas of newborn infants. Nevertheless factors such as overfeeding and allergic manifestations must be considered possible causes. Because of the rapidity with which these patients become acutely ill, the newborn needs special consideration. All infants but those with the most mild cases should be hospitalized early if they have a true diarrhea.

In office practice not all newborns with symptoms described as diarrhea actually have a true one. The term "diarrhea" as used by the mother in many cases means simply an abnormal stool or increased number of stools. In many areas of the country it is common practice to send a mother and her newborn infant home from the hospital on the third or fourth day after delivery. Many of these mothers are concerned by the color and consistency of the stools in the first week of life and frequently confuse transitional stools with diarrheal stools. Normal occurrences such as the passage of a stool at each feeding are sometimes considered diarrhea by the mother. It is not uncommon in the third and fourth weeks of life to see an infant who is having true watery stools because he is on a formula which is too weak. The mother may have felt that she has to greatly increase the volume consumed in order to furnish enough calories to satisfy the infant.

SPECIFIC DIARRHEAS

Diarrhea in infants during and beyond the newborn period may be due to a specific bacterial organism. Much depends upon the history, the clinical findings and perhaps the season of the year. These specific bacterial diarrheas, though severe, probably make up a rather small percentage of the total number of cases seen. Stool cultures are valuable in isolating the pathogen, in selecting or continuing appropriate medication, and in instituting proper control measures in an effort to prevent spread of the organism to other people. It is not practicable to withhold medication until the stool cultures have grown out a specific organism. If in the course of the disease the appearance of the child and nature of the stool make one suspect a specific diarrhea, the patient should be given adequate medication immediately after obtaining a stool culture.

DIARRHEAS ON AN ALLERGIC BASIS

Diarrhea which is allergic in origin can be seen at any time during infancy and childhood. Allergy must be considered one of the possible causes if a diarrhea occurs soon after placing a newborn infant on a milk preparation. For this reason it is particularly important to take an adequate family allergy history in all cases of diarrhea. It is often found that a sibling has had similar difficulties and had to be placed on a hypoallergenic food preparation to control the diarrhea. A family history of asthma, allergy, hay fever and eczema may prove significant. At the ages when items other than milk are first added to the diet, allergic manifestations in the form of loose stools may be seen. It is common practice to place infants on orange juice at an early age, and loose stools frequently result. If the infant is on a prepared milk that has been fortified with multiple vitamins or is receiving a multiple vitamin preparation, it is probably better to wait and start orange juice at the fourth or fifth month. Multiple vitamin preparations have also been known to be responsible for diarrhea in some cases. Any new food added to an infant's diet is a potential cause for diarrhea on an allergic basis. For this reason it is best to start only one new food at a time. Cereal is usually the first solid that is added to the infant's diet, and in many cases diarrheas on an allergic basis can be attributed to one of the grains, most frequently wheat. These diarrheas are usually brought under control by avoiding the offending food.

PARENTERAL DIARRHEA

Probably the largest number of cases of diarrhea seen in office practice would fall in the category of parenteral diarrheas. In many cases it is difficult to tell whether the diarrhea is a true parenteral diarrhea or merely a superimposed intestinal infection which takes place in an infant or child whose resistance is already low from the primary infection.

The occurrence of diarrhea along with otitis media, pharyngitis and other upper respiratory tract infections is common. Frequently the symptom of loose stools is the reason for bringing the infant or child to the physician rather than the respiratory infection itself. The degree of severity of these diarrheas varies greatly, depending somewhat upon the state of health before the infection. It seems that children who are chronically ill or those who are prone to have frequent infections display the symptom of diarrhea more frequently. When one treats the primary infection specifically and the diarrhea symptomatically, these cases usually respond well.

TREATMENT OF DIARRHEA

The decision to treat an infant or child with diarrhea on an outpatient basis or in the hospital cannot always rest on one factor. Among im-

portant factors to be considered are the age and size of the patient, the degree of dehydration, the length of illness, the presence or absence of other illnesses and the reliability of the parents.

Generally speaking the patient who needs parenteral fluids should be hospitalized. There may be some borderline patients in whom it is desirable to administer subcutaneous or intravenous fluids over several hours in the office and then send them home on oral fluids or on nothing by mouth for several hours. These are usually children who have associated vomiting and may be unable to retain oral fluids for some time, or children who, although no more than mildly dehydrated when seen, can be predicted to lose more fluid than oral intake will cover over the next 24-hour period.

Nothing by Mouth

The value of giving nothing by mouth for a few hours or longer is not to be underestimated. The number of stools may thus be reduced by avoiding stimulation of the gastrocolic reflex. This is beneficial regardless of the etiology of the diarrhea and particularly if the diarrhea is associated with vomiting. Very mild forms of diarrhea may be managed by simply withholding all foodstuffs and liquids for a few hours and then giving only clear liquids for 24 hours. This is particularly true in older children. If the symptoms subside in 12 to 24 hours, the child is then gradually returned to a normal diet over a period of 3 to 5 days, depending on the severity or persistence of the diarrhea.

Oral Fluids

In the moderate or more severe cases of diarrhea, after a period of gastrointestinal rest, the giving of oral fluids in some palatable form is essential. Tea, carbonated beverages, flavored gelatin water, bouillon or a homemade electrolyte solution can be given orally. If a homemade electrolyte solution is used, it should be written out for the parent so that there is no misunderstanding as to the amount of salt and sugar to be added to the water. One should keep in mind the danger of too much electrolyte. Instructions should be well understood by the mother when preparations such as Lytren are used.

When the diarrhea has abated, milk can again be added to the diet. It is probably better to add it to the diet gradually and slowly increase the amount over a period of two or three days. In some cases, if the diarrhea has been severe, skimmed milk or dilute skimmed milk for the first 24 to 48 hours is preferable to whole milk or full-strength formula.

The Return of Solids to the Diet

When the infant is taking milk without difficulty, a gradual addition of solids to the diet is preferable. Such bland foods as Jello, cottage

cheese, cooked cereals and bananas are probably the best items to add at first. When these are well tolerated, vegetables, meats and fruits may follow.

Following up the Patient

One of the most important factors in treating the patient with diarrhea on an outpatient basis is keeping in close contact with his family. This may be done either by return visits or, in the less severe cases, by telephone. In diarrhea it is impossible to predict the course of the diarrhea or the changes that might take place from hour to hour or day to day. Therefore it is difficult to be able to give the family instructions to follow for the entire illness. Except in very mild cases, it has been our plan to check with the family at least once daily by telephone until the illness seems controlled. The parents are instructed to contact us if the stools become more frequent or watery, if the urinary output becomes decreased, or if the infant is unable to retain liquids. Many of these cases are successfully handled by telephone after the initial visit.

SUMMARY

All the potential causes of diarrhea must be considered in the patient who presents the symptom of diarrhea. The decision to admit the child to a hospital or to treat him on an outpatient basis greatly depends upon the experience of the physician and the cooperation of the parent. It is of utmost importance that the family be able to carry out the physician's instructions and to keep in close contact with the physician regarding the patient's progress.

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THE BULKY STOOL SYNDROME

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Every now and then a child will be brought to the physician with the complaint that the patient's stools are so large that they block up the toilet. There are a number of causes for this condition, including (1) malabsorption syndrome associated with mucoviscidosis or celiac disease; (2) incomplete obstruction of the bowel secondary to a congenital disorder such as megacolon (Hirschsprung's disease); (3) constipation due to improper diet and lack of training with periodic evacuation of the bowel.

It is not the plan of this paper to discuss the malabsorption syndromes or the congenital incomplete obstructions. These rare conditions are adequately discussed in textbooks of pediatrics. Rather, it is my purpose to discuss the common complaint of chronic constipation. The difficulty here is usually twofold—(1) improper diet and (2) poorly developed bowel habits.

THE DIET

The diet in many households consists mostly of quickly digested and rapidly absorbed carbohydrate foods. Breakfast often consists of sweet rolls, manufactured cereals and milk. Peanut butter sandwiches and milk often constitute lunch, and dinner is usually made up of meat, potatoes, bread and milk. There is little or no roughage to stimulate peristaltic activity, and constipation results. After several days without a stool the child is given a large dose of some sort of laxative or an enema. The resultant stool may be large enough to block the toilet. The same diet is continued, and the cycle of constipation, laxatives, enemas and blocked toilet repeats itself.

Roughage foods such as vegetables and fruits are not as attractive to children as the diet described above. They are somewhat more difficult and troublesome to prepare and are more expensive. Fruits will be accepted without too much coercion, but green vegetables are frequently refused. The best fruits are ripe apples, prunes, peaches and seedless raisins. When bananas are constipating to a child, they should

not be allowed. Most people do not know that they may be constipating. Also, the whole fruits themselves are much better than their juices alone. Salads made of vegetables and fruits often seem delicious to adults, but for some reason little children do not like them.

BOWEL HABITS

The other common cause of constipation is faulty bowel habit. The child does not want to stop his play long enough to sit on the toilet. He may be afraid to go because of previous painful experiences with hard stools. He may like to attract attention to himself by making his parents worry about his constipation and may even take a negative attitude and refuse to go because they want him to do so.

These emotional blocks are difficult, time-consuming, and trying to manage. In training any young animal, human or otherwise, there are two things that are fundamental, i.e. firmness and discipline mixed with gentleness, kindness, love and playfulness. The child who loves his parents will do anything to please them, but there are many children who would rather tease and worry their elders than make them happy. Under these circumstances, however, mother and father might have helped to bring about such a state of affairs. Parents who have the most trouble with child training are those who insist upon scrupulous order and discipline without much exhibition of love or playfulness on their part. This causes resentment and negativism in the child. The parent-child relation must be one of happy, loving, relaxed give-and-take in order to get the best cooperation. Games, play, laughter—all these things have important contributions to make if a child is to become receptive to suggestions and obedient to commands.

The importance of the daily bowel movement is a fetish in many households. The size and appearance of the stool are vividly described by the mother to the physician and even to her friends. The failure to perform daily evacuation may become the source of great parental concern with resulting damage to the child's emotional make-up. The physician must be careful to subdue this anxiety, but not to deny its importance in the comfort of daily living. We have all known people who are perfectly well, but defecate only two or three times each week, although it is true that they sometimes block the toilet at these times. So far as children are concerned, the real danger of going two or three days without evacuation is that the large, hard dry stool may cause so much pain on passage that the child is reluctant to go to stool at any time. This is why it is important to keep the stools soft so as to prevent this traumatic experience.

MANAGEMENT

Diet

Fruit, cooked or raw, should be given with each meal. Raisins can be mixed with cereal. Children need food between meals; otherwise their

blood sugar gets low and they become fretful. Give fruit at these times rather than cookies. Do not give bananas to a constipated child. Oatmeal or whole wheat cereals are much better than so-called prepared cereals.

Stool Softeners

Many preparations of mineral oil, agar and other bulk-producing preparations are helpful. Plain Petrogalar, 1 or 2 teaspoonfuls at bedtime, and Polykol or Colace, 1 cc. once or twice daily, are good. Metamucil, Siblin and Saraka are good bulk producers. These stool softeners and bulk producers should be given every day over long periods of time. It is sometimes necessary to add a little laxative to these stool softeners, particularly at first. Cascara evacuant or milk of magnesia, 1 or 2 teaspoonfuls daily, with the softening agents or separately, is helpful. These laxatives are gradually discontinued as the bowel habits get established.

Vitamin B Complex

All the vitamins are necessary for the child's health, but vitamin B complex is particularly good in keeping peristalsis moving. Borcherdt's Malt Soup Extract is an old and dependable preparation—1 or 2 tablespoonfuls daily mixed with fruit juice or milk. Yeast in any form is a good source of vitamin B complex, e.g. Zymenol, 1 teaspoonful one to 3 times daily.

Habit Time

One should insist upon a short sojourn on the toilet 2 or 3 times daily, preferably after meals and not lasting more than 5 or 10 minutes. Great tact and persuasiveness must be used to keep this from being a source of parent-child irritation. The child who is tense or angry or crying cannot defecate. He must be relaxed and in good humor to be successful. Naturally such bowel training is a nursery procedure. If good bowel habits are developed by the time the child is five years old and ready for kindergarten, they will probably carry on throughout life.

SUMMARY

Constipation is a real problem. It must be approached with courage and confidence so that it can be controlled. Associated fear and emotional turbulence are factors to be considered in the management of the condition.

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MANAGEMENT OF OBESITY

P. PATRICK HESS, M.D.

The ideas presented here are expressed by one who believes that a breakfast of bacon, eggs, toast, butter and coffee with cream is "the great American poison." In fact, I believe that anyone who hopes to cope with the problems of obesity should be convinced of this. Obesity is a slowly cumulative toxin like atomic fallout and, similarly, when alarming symptoms appear, it is late in the disease. Fortunately, the effects are reversible,[1] but the accumulation must be eliminated and further exposure avoided.

We hope that the analogies and hypotheses of the following paragraphs will compensate by their utility for any deficiency in accuracy, a sort of cracker barrel physiology which may serve to give the patient a picture of what overeating and accumulation of fat do to his body. Their purpose is twofold: (1) to help the physician to avoid damaging the patient; (2) to give the patient an understandable picture of how to increase his work-energy ratio.

SELECTION OF PATIENTS

Laboratory studies are rarely done on children who come in with obesity as the presenting complaint if the physical examination gives no clue to anything other than a dietary etiology.[2, 18] The manner of handling depends upon (1) the age of the child, (2) the feeling of the child about his problem, (3) the presence of obesity in the parents or other members of the family, (4) the nature of the parental concern with this problem.

Treatment consists of (1) diet, i.e. modification of the patient's attitude towards eating or oral gratification; (2) exercise, actually an orientation of the patient in the direction of increasing the frequency of his muscular contractions; (3) anorexigenic agents.

Obesity as a problem seems to be rarest in infants and preschool children, possibly because of a greater latitude in the limits of what is generally accepted as normal. It may also be modified by the relatively greater physical activity of infants and toddlers. Decided obesity

at this age might be more suggestive of some pathologic state. I have never seen a child in this age group who required anything other than mild dietary restriction to handle his problem. Anorexigenic agents have never been used.

Obesity in the ages of about 5 to 10 years is usually accompanied by more defense reaction, or at least a resistance to correction of the situation. Discussion with parents of the eating habits and diet control must be thorough in this age group, stimulation to more physical activity persistently attempted, and occasionally anorexigenic agents are used.

CHILD AND PARENT ATTITUDES

Obesity begins to become a personal problem when the child reaches the age of 10 to 14 years. These children are acutely aware and are more anxious to cooperate, can be stimulated to make the sacrifices, will respond to encouragement about exercise, and are given more explicit and rigid diet lists. Anorexigenic agents are used routinely. The majority of the successful ones do exacerbate. No difference has been noted between boys and girls in this regard, and those who are going to be unsuccessful are usually evident from the beginning.

If the parents' esthetic sense is offended by looking at the fat child, or if they are embarrassed at the prospect of incurring criticism from others because of the size of their offspring, if they are getting pleasure out of stuffing their youngster, or if they feel guilty or resentful because they are faced with a problem which they cannot solve, success with the patient will be retarded or completely prevented as long as these attitudes persist. If the mother who brings in the child is suffering from obesity herself, one is hampered if she is unwilling to engage to some degree in this problem also. If the parent who brings in the patient is not overweight, but the mate is obese, we may assume that this family probably has weightier problems than the one which brought them to the office.

In children whose obesity is a personal problem the stimulus to lose weight must come from themselves. They must learn to use restraint and to procure their own rewards. The prospect of incurring the physician's disapproval or of earning his praise should be of less importance. If the patient fails to lose weight, he or she is told that success depends upon whether he *wills* the result of control or prefers the immediate relief of satisfaction of his appetite.

For an obese person to become thin and stay thin, he must be prepared to make changes in his habits which are to last a lifetime.[3] From being inactive he must become active; from succumbing to the urge to eat he must learn to tolerate the urge for oral gratification. He may never become one who is spontaneously drawn to physical activity. He may always have to fight his urge to eat excessively.

If eating is a means of relieving emotional tension, he may become nervous or disturbed or develop some substitute for this method of relief. Psychiatric help may be needed or the obesity will return if the "nervousness" is of sufficient degree or the substitute undesirable or

productive of guilt.[4] The complaints of dieting people who fail to hold their weight down—headache, nervousness, weakness—are the same as those of people giving up alcohol, cigarettes or any "crutch." These symptoms are associated with the blocking of a long-standing habit or compulsion. They are the manifestations of anxiety.

PHYSIOLOGY

In considering that an obese person may have the same number of heart muscle fibers that he had when he was thin (he may have less), it seems obvious that sudden or severe exertion renders him susceptible to myocardial ischemia because of the added work load—even without diminution in the caliber of the coronary vessels. In the obese human being the load increases, the power of the engine may remain the same or decrease, the caliber of the fuel lines may remain the same, but probably decrease, and the oxygen supply, the vital capacity, is less. With such a precarious state of affairs it is not surprising that the occurrence of myocardial ischemia is an imminent possibility.

EXERCISE

With this threat of ischemia should we not, then, be careful to avoid prescribing exercises that are too harsh or hazardous because of the possible danger of deranging the balance between myocardial work load and myocardial oxygen supply? In prescribing exercises for the obese patient it is suggested that the occurrence of fatigue in the patient be used more as a warning signal than a safety valve, more comparable to the slipping of a freight engine's wheels than to steam blowing off the boiler. Urge the patient to engage in his exercises with some degree of confidence and a feeling of accomplishment. He can do it because it is scaled to what he is capable of doing.[5]

It is difficult for an obese person to do active physical exercise because of tachypnea secondary to decreased vital capacity, poor muscle tone, and the retarding effect of the "habit of lassitude." The postprandial lethargy or satiety is experienced many times a day by one given to frequent snacking, especially of high carbohydrate foods. Furthermore, exercise, when it is initiated, often takes the form of activity tending to increase muscle "power." Obese boys may take up weight lifting, for example. It is pointed out that this is about as likely to be successful as trying to thin down a draft horse by having him pull a wagon load of logs out of a mudhole. In other words, that kind of exercise is exactly the kind for which the draft horse is built.

Changes in the obese person cannot be expected to take place overnight, and the slow rate of this process is emphasized to the patient. The importance of being convinced of this and believing that he can do it should be stressed above all. Exercises are then begun gradually, and patients are told to avoid fatigue which causes them to stop or to become discouraged or hungry.

The physical activity needs to take the form of light, quick, rhythmic movements aimed at repeated relaxation and contraction of the muscles

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and to increase the tone of the entire muscle mass as a unit. The patient is instructed to work to the point of fatigue, no matter what his threshold; then stop, rest and begin the activity again to the point of fatigue. Or he can start immediately with a different set of muscles and perform the new activity as though beginning refreshed. For example, if three deep knee bends produce fatigue, then stop and switch to a stretching exercise, either horizontal or vertical.

Beginning exercises consist of stretching activities performed while lying on the floor for 15 minutes a day as a minimum. These are begun supine and carried to the point of fatigue; then rest; then prone to the point of fatigue and again rest; then supine, then prone, and so on. Note that it may be inadvisable for the obese to do exercises which produce a sustained tachycardia, especially if his vital capacity is decreased. If the patient has a bicycle, he or she is instructed to ride steadily for 15 minutes daily, preferably standing up, but again avoiding fatigue.

Deep knee bends are practically an essential for gaining sufficient strength to be able to go on to other exercises. These are started holding onto a chair, and the patient is told to do only as many as he can do rhythmically and without fatigue, even if only one or two. Back muscle exercises, i.e. extensor muscle strengthening, are stressed at all times. This is the key to good physical conditioning and of course to good posture. Practically all the patient's activities of his daily life, from tying his shoes, carrying in groceries, hugging his girl or brushing his teeth, are flexor muscle exercises. *It is almost safe to say that one could omit advice about flexor muscle exercises entirely and be confident that the patient would maintain flexor tone on his own* (Fig 14).

The patient is told that exercise is performed whenever a muscle is contracted, and in order to maintain his "defatted" status with any degree of ease he must concentrate upon keeping his muscles toned all day—to walk on tiptoe and reach strenuously for the ceiling from bed to bathroom—every time; to brush his teeth with one leg extended in back of him, to extend his leg frequently when sitting, to tighten his gluteals or rectus abdomini; and that these things may be done a hundred times a day without shortness of breath or noticeable fatigue. It would seem to me that weight loss without increasing muscle tone would lead to decreased strength, feeling of weakness, worse posture and probably to hernias.[17]

I do not disparage vibrators or muscle contractors or instruments which produce repeated muscular contraction by galvanic stimulation.[6] If the "energy of fat mobilization" has any validity, these may do their work at this focus. At worst the muscle contractors may produce a rather bizarre distribution of strong muscles in an otherwise weak body, but it seems to me that a muscle could not possibly know whether its stimulus to contract came from the brain or from some electrical gadget. As long as it is contracting, it is performing muscular work, however futile, and work will strengthen it. Furthermore it is practically impossible to make contact with a vibrating force of any kind without reacting to it, and the

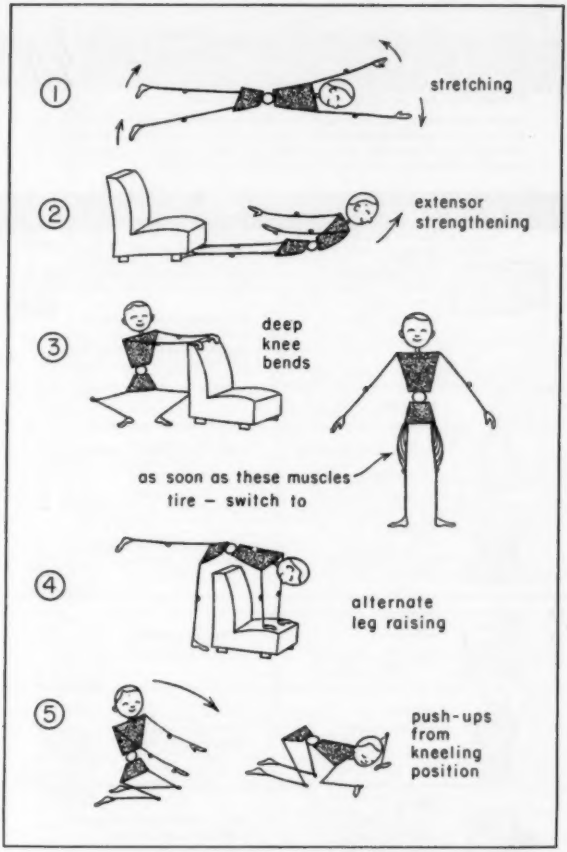

Fig. 14. Reducing exercises.

reactions consist of muscle contractions. This requires energy, energy supplied by the combustion of food measured in calories.

Stored fat is "in reserve" like the gas in the wing tanks on a plane. It is not used unless the regular supply runs out. A bear does not deplete his fat stores until he hibernates (stops eating). Therefore *exercise* is most effective when the stomach is *empty*. The patient cannot exercise without using energy, and the calories have to come from some place. According to Mayer,[13] persistent exercise does not increase the appetite. The initial increase in appetite in an obese person who is beginning exercises is probably an emotional reaction.

DIET

In the past the patient was given a list of sample diets totaling about 1200 calories, using whatever lists were handy, and there was not too

HOW TO LOSE WEIGHT UNDER YOUR DOCTOR'S DIRECTIONS

As your doctor has explained to you, anybody who really wants to lose weight can do so with relatively little effort and almost no suffering. Since some foods contain many calories and make people gain weight while other foods do not, a switch from the one to the other will help in reducing weight.

On the table below, you will find many tasty nonfattening foods which you can **eat instead of** fattening dishes which you may have been eating in the past. By following the suggestions and your doctor's recommendations, you will lose weight, and even your friends won't know that you are on a diet.

INSTEAD OF	USE
BREAD with breakfast (white, wheat, rye, pumpernickel, rolls, French, etc.)	a slice or two of melba toast (rye, plain, whole wheat), Ry-Krisp
with main meals	celery sticks or carrots; relishes (bread and butter pickles, cucumber pickles, dill pickles, India relish, pickled onions, sour pickles)
BUTTER on bread	a small amount of jam, jelly or marmalade
for fried or scrambled eggs	double boiler; or poached or soft boiled
for cooking	see under "Gravies"
CEREALS a bowl of cereal, cooked or uncooked	one egg (boiled, or scrambled in double boiler); fruit cup
CHEESE all kinds	cottage or pot cheese
DRINKS soft, sweetened	unsweetened drinks or those made with artificial sweetening agent
FRUIT cherries, plums, bananas, grapes, avocados, apples, raspberries	freely: fresh watermelon, peaches, strawberries, blackberries, gooseberries; sparingly: tangerines, pears, grapefruit, oranges, apricots
dried fruit	fresh fruit; or dietetic pack canned fruits
canned, syrup-packed or sugared, frozen	canned, dietetic or water-packed
FRUIT JUICES canned, sugared	fresh or unsweetened frozen orange, grapefruit or apricot (one 6 oz. glass)
GRAVIES rich sauces and gravies derived from the meat	see under "Frying"
seasoning with butter and other fats, thickening with flour, potato flour, cornstarch, tapioca	plain condiments, herbs, celery, chives, cinnamon, dill, lemon, lime, mint, mustard onion salt, pepper, salt, vinegar, garlic, pickles, catsup, paprika

Fig. 15. Tepanil non-calorie-counting regimen.

INSTEAD OF	USE
ICE CREAM ice creams	sherbet or water ices
MEAT, FISH, FOWL fat meats such as pork, ham, bacon, sausage, lamb, goose, sardine, other fish canned in oil	lean meats such as liver; beef with fat trimmed off; chicken or turkey; fish (other than salmon), shrimp, crab meat, lobster, clams, oysters
MILK PRODUCTS whole milk, light or heavy sweet cream sour cream	skim milk or fat-free dried milk powder yogurt
SALAD & SALAD DRESSING French, Russian dressing; vinegar-and-oil	greens and/or any of the vegetables listed below, served with vinegar, lemon; possibly add yogurt or cottage cheese
SOUPS creamed or thickened	bouillon, consommé, jellied clear soups, jellied consommé, jellied madrilène, fruit cup
SWEETENING sugar, molasses, syrup	saccharin or other artificial sweetening agents
VEGETABLES potato, peas, beans, corn, rice, macaroni, spaghetti	freely: asparagus, broccoli, cabbage, cauliflower, celery, chicory, cucumbers, escarole, lettuce, greens (beet, chard, dandelion, kale, spinach, turnip); mushrooms, okra, parsley, green pepper, radish, romaine, rhubarb, sauerkraut, summer squash, tomatoes, water cress; sparingly: string beans, beets, Brussels sprouts, carrots, onions, pumpkin, rutabaga, winter squash, turnips

Instead of **frying** ..... boil, broil on grill, toast, stew, pressure cook, steam

Instead of **serving heavy appetizers such as chopped liver, herring in cream sauce, etc.** ..... serve fruit cup

Instead of **serving the vegetable salad with the meal** ..... serve it before the meal

Instead of **serving sweet desserts (cake, pastry, pie, etc.)** ..... serve gelatin, custard, fruit whip, fresh fruit in aspic of artificially sweetened gelatin

Instead of **gulping** ..... eat slowly—chew well

℞ _____

_____

_____

Fig. 15 (continued).

much plugging of brand names. This was discussed with the patient, adding anything else which he or she is permitted. It seems important that—using a 1200-calorie diet list or less—one can always add a pretty impressive number of things in the margins. The newly printed Tepanil Non-Calorie-Counting Regime seems to be the most satisfactory dietary sheet which I have seen (Fig. 15). It helps to avoid calorie counting, which seems to be artificial, burdensome and conducive to unbalancing the nutritional components of the diet. It may potentiate the feeling of guilt when cheating occurs. With the increase of the feeling of guilt there follows a feeling of discouragement, then anxiety related to the fear of failure or of punishment. When this happens, there is a tendency to relieve the anxiety by getting something to eat.

If the patient follows this kind of dietary regimen persistently, one can be confident that he will sooner or later arrive at a state of nutritional equilibrium even without rigid adherence or intensive exercise. Berryman[3] says that it is likely that the caloric level of reducing diets should be considerably higher than is customarily used if long-term reduction of weight is to be attained. We may consider that some patients have succeeded if they can educate themselves to this practice, especially those in whom the habit of overeating and inactivity have been passed from generation to generation like a legacy (a word that may be more accurate than "heritage").

Correcting the dietary quality first, with caloric quantity pushing hard for second place, may offer the patient a goal which is not too difficult to attain. The intensity of this approach may vary from patient to patient. Some patients may do better with rigid controls and difficult goals. Others may adapt well to a system that is more elastic.

Between-meal snacks can be put off until his feeling of hunger is no longer tolerable. Items utilized for this purpose are melba toast, rye crisp, celery sticks, carrots, pickles, fresh fruit, fruit juice and sherbet or water ices. I think that the patient is less likely to "cheat" if he is given this latitude.

Very much freedom is given to the amount of lean meat and vegetables (cooked without fat) at mealtime. Saturated fats such as butter, mayonnaise and ice cream are eliminated, since even children may already have some atheromatosis.

Unsaturated fats such as olive oil, Mazola or Wesson oil are used when necessary. EMDEE adds a "margarine of safety," but its use should be limited to 1 or 2 teaspoonfuls daily.[9] Their harm can be explained to the patient by the simile that saturated fats behave in the arteries as they do when you pour them down the drain—they stick to the sides. Consider it as if oils are lubricants and not fuels. Ask the patient how his car would behave if he put 6 quarts of gas in the crank case and 20 gallons of oil in the tank. Mineral oil is not advised. The use of noncaloric sweeteners can be decided on an individual basis.

Skimmed milk is used instead of whole milk. If desirable, especially in younger patients, nonfat dried milk can be diluted with it instead of water, restoring its caloric content and increasing the protein. Control of milk intake may meet moral resistance, since many families

revere it more as a sacrament than a beverage, imparting whiteness to teeth and soul.

What can the dieter do when a bunch of teenagers meet at the soda fountain after school and *everyone* is having a milk shake and potato chips? If the obese members of the group have not been "evangelized," how can the patient resist? Enthusiasm, if it is to obtain results, appeals to vanity, and the satisfaction of feeling physically fit plus help from an appetite suppressant must prove sufficient. One encounters years of habit enforced by the herd instinct, an instinct which is at its peak in the teenager.[10]

ANOREXOGENIC AGENTS

Anorexogenic agents complement the *will* of the patient. Physicians complement the judgment. If the will is strong enough, these agents are unnecessary. In order to make a satisfactory judgment about anorexigenic medication, we must know what is required of it. These agents should (1) be nontoxic with a wide margin of safety; (2) exert minimal undesirable side effects, physiologic or emotional; (3) suppress the appetite; (4) be economical. Current acceptable products include (1) diethylproprion (Tepanil, Tenuate), (2) phenmetrazine (Preludin), (3) amphetamines, (4) atropine. We use dextro-amphetamine in our office.[11, 12]

If the anorexogenic agent acts as a mild central nervous system stimulant, it may have some additional advantage in possibly potentiating the stimulus to increased physical activity. Also, is not the act of giving up a habit that is so satisfying a depressing experience? Is not one of the effects of eating a relieving of depression? Some patients on other anorexogenic agents say that they do not get a "lift" from them.[13] Could it be that what they feel is a slight depression resulting from food deprivation and decrease of oral gratification? The hibernating bear which was mentioned previously is "depressed" into complete inactivity. In our experience there have been no instances when it was necessary to discontinue this medication because of poor tolerance. The patient is given Dexamyl spansules, 10 mg. to be taken every morning upon arising. I know of no reason why one of the other agents could not be used in proper dosage.[14]

These spansules are prescribed 30 at a time and are marked nonrefillable for obvious reasons, including the prevention of unsupervised medication. The spansule has the advantage that medication need be taken only once daily. This decreases the likelihood of forgetting and avoids the temptation to have a milkshake *before* taking the noon pill if a short-acting drug is used. If the patient is to take a pill three or four times daily, he would then have to submit to the mental discipline of renewing his "pledge" before each dose, an undesirable situation.

I do not discourage the use of pacifiers in infancy. Anyone who chews gum or smokes would be a hypocrite to do so. But in the management of obesity, "pacifiers"—i.e., bulk fillers—are not used.

FOLLOW-UP

If the patient is carried through to ideal weight without ever having challenged his urge to put something into his mouth and fill his stomach, what will you do with him then?[15] He is seen and weighed, and the pulse, temperature and blood pressure are checked every two weeks. At these visits he is questioned for undesirable side effects of medication and given a pep talk.[16] Further explanations about diet and exercise are given if needed.

After one to three months the spansule is tried every other day and discontinued when the weight is stabilized at a satisfactory level. This may not yet be "ideal," but the stability of the "habit pattern" is more important than the weight. The patient may not yet be at the optimum weight, but the whole program is presented as though it were a course of education, three to six semesters long. It is hoped that the effects produced and the new habits formed will last a lifetime.

In essence, the patient is told this: "You are exposed to this diet. You are given this pill. The importance of physical activity has been explained to you. If you want to lose weight, you will. If you do not lose weight, it will be because you do not wish to do so badly enough. If you are successful, you will be able to say, 'I did this myself. The doctor didn't make me; no one gets credit but me.' If you are not successful you can say, 'I evidently enjoy eating more than being slim —even at the expense of looking the way I do.'"

SUMMARY

In prehistoric times obesity may have shortened life by retarding the attempt to flee from danger. Today we are still faced with threats to our security, and although the nature of these threats has altered, our responses remain the same: emotional and physiologic pressor reactions. By a strange paradox our very defenses have become our enemy.

When man had to forage for food, he paid a caloric debt to his body when he sat down to eat. He was replacing the energy expended in obtaining it. Today our meals are obtained without equivalent effort, and the amount consumed may easily exceed the total caloric expenditure for the entire day. The practice of eating beyond our requirements renders us prey to the normal physiologic mechanisms which were meant to protect us. Medical science is now so "advanced" that we may now be able to suppress the intensity of this pressor activity so that we may go on eating. Such a development is a symptom of an effete technological society and is the ultimate in horse:cart reversal.

The aim of this article has been primarily to stress the importance of an aggressive approach to a condition that is essentially self-destructive, and secondarily to suggest sources of the means to that end.

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THE DIABETIC CHILD

AFTER STABILIZATION

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During a period of hospitalization for the control of diabetes the parents and their child are apt to anticipate the return home with a great deal of anxiety and apprehension. This state of mind may be greatly relieved by a careful explanation by the physician. The parents should have a complete understanding of what is expected of them and their child in a program designed to stabilize diabetes. It is far better to make this explanation at the start than to try to do it later. Since the mother is the member of the family most responsible for the care of the child and the preparation of meals, it is most important that she have a complete understanding of the problems. Office visits every three months in the preschool child and every six months in the school child are often all that is necessary if the mother is intelligent and careful. She is instructed to call any time she is worried or has a question, however. This would include such times as those when there is some question of an operation, an infection or a trip planned or anything else out of the ordinary.

During the office visits it is well to discuss the progress of the child with the mother. She should be cautioned about acidosis and shock and be taught their signs and symptoms. A record of a careful examination is placed in each patient's chart, and a record of growth and development is maintained. The child may also be weighed and measured at monthly intervals at home so that both mother and physician will know whether or not growth and development are adequate. The mother should be told of polyuria and its implications. Changes in urinary habits in a child who is normally dry to one who wets the bed should be reported.

No one person is in a better position to know the habits of the mother, the family and the child than the personal physician. This knowledge can be valuable in avoiding dietary and other difficulties. The mother is not given a long list of printed or written instructions. But before she returns home from the hospital, one should spend much time with her. She must understand the problems she may encounter while attempting to help her child in such a way as to maintain con-

trol of the diabetes. At the same time one must offer some solutions to problems she is likely to encounter.

DIET

Diet is an important part of the care of the diabetic child. Although the term "free" is a misnomer, one should attempt to offer a diet which is as close to a normal one as possible—appetizing food which the whole family may enjoy. Unnecessary sweets or extra snacks or drinks high in carbohydrate content are to be avoided. Still, too much restriction is bad. Control of diet invariably breaks down if rules are too stringent. One family in our practice wanted to use diabetic foods, since this was what the father, also a diabetic, had been using for years. Parents often have to be asked to discard foolish and unreasonable ideas about diet. Some of these ideas are impractical, and the use of diabetic foods falls into this category. Children, particularly the toddlers, will not accept them. Diet exchange sheets are printed and distributed free of charge to physicians in practice by Eli Lilly & Company. They have been found to be quite adequate. Weighing and measuring foods becomes such a burden for a busy mother that all control of the diet is likely to break down.

The diet is adequate if there is sufficient caloric content with about 40 per cent of it carbohydrate, 20 per cent protein and 40 per cent fat. Normal growth and development are indications of its adequacy, and little else can be required of the mother who prepares it. A simple means of estimating caloric needs is based upon the allowance of 1000 calories starting at the age of one year and increasing this by 100 calories for each additional year as long as it maintains well-being. Most diabetic children get along well on four or five meals a day. This includes the usual three meals with a snack of milk and toast or crackers after school and at bedtime.

EXERCISE

Nearly all children have some decrease in their insulin requirement after they get home from the hospital. Some children may even return to an almost normoglycemic state with little or practically no insulin requirement. Winter time seems to be the most difficult for parent and child alike, particularly the preschool child. Some planned activity or nursery school program may be utilized. Times of rest, usually after school, are equally important in order to avoid excessive fatigue. Summer or spring months ordinarily liberate the diabetic child from home confinement and allow a full range of activities, including summer camps especially arranged for diabetic children. There is no reason why the stable diabetic child should not attend regular camp with his nondiabetic fellows, provided he knows how to give his own insulin and can be depended upon to check his own urine for sugar and acetone. The diabetic child should be made to feel that he can engage in most of the same activities as his friends. Adherence to his diabetic program usually allows complete, unrestricted activity.

CARE OF THE SKIN AND NAILS

Intertrigo and impetigo are two problems in skin care which frequently occur and must be scrupulously managed in the diabetic child. The diapered child or toddler in restricted training clothes is particularly susceptible. The mother is instructed to cleanse the diaper area gently with Dial soap (Armour & Co.) or pHisoHex (Winthrop & Co.). If irritation occurs in spite of these measures, some emollient topical ointment such as Desitin (Desitin Chemical Co.) or zinc oxide ointment is applied to the area. The older preschool child and the school child must have his impetigo cleared promptly with the use of the above-mentioned soapy scrubs plus the application of a nonsensitizing topical ointment such as Spectrocin (Squibb & Co.) or a preparation containing 1 per cent bacitracin. If the patient has severe impetigo, furunculosis or any more serious skin infection, it may be necessary to increase the insulin dosage temporarily. The urine should be checked for sugar and acetone four times daily during these infections and the insulin dosages adjusted accordingly. Other infections are promptly treated with the appropriate antibiotic, depending upon their etiology. The mother must be warned of the dangers of infections and instructed to report them immediately to the physician.

As for dental care, all children are examined for caries during routine office visits. Caries commonly occurs in diabetic children, and such patients should be promptly referred to a dentist.

Routine immunizations may be given, provided the child is in a state of diabetic equilibrium and in good general health. If there is any untoward reaction to their administration, they should be omitted or divided into lesser amounts and given over a longer period of time.

Care of the nails is important because children are always stubbing their toes, perhaps biting their nails, or getting them traumatized in doors. Any trauma or infection such as paronychia must have prompt attention.

INSULIN ADMINISTRATION AND URINE CHECKS

Usually the child returns home on a long-acting insulin adjusted in one way or another to only one daily injection. NPH insulin is the most effective in the juvenile patient. The child who shows an allergic response to NPH insulin may do so because of the protamine it contains. Lente insulin should be substituted. These two insulins are similar in their effect and simple to give, but the parents should both know how to prepare and administer the insulin at home. However, the child should be persuaded and taught how to give his own insulin as soon as he is old enough. This is usually around school age. The insulin is administered according to a plan, allowing for a different site for the injection each day. It is given in the prebreakfast period, usually about 30 minutes or so before the meal. Cosmetically undesirable lipodystrophy occurs if varying sites for the injection are not chosen. It may take years for such subcutaneous fat loss to regenerate. Sites about the lower portion of the abdomen, upper part of the thighs and

the trunk are more desirable than those on the arms or lower legs.

The patient is seen in the office once each week for a month after discharge upon hospital stabilization. This depends, of course, upon the patient's progress. Monthly visits are advised for the next three or four months after this first month at home. If the patient continues to do well, he may need to be seen only once every three months. If the child is over five, he may be seen only once every six months or even longer. His height and weight are plotted on the Iowa Growth and Development Grid. This is an important means of measuring progress. These charts are furnished by Mead Johnson & Company to all private physicians upon request.

Office visits call for a careful physical examination, including blood pressure determinations and a look at the eyegrounds and lens. Routine urinalysis and hemoglobin determination are performed. Blood sugar determinations are of little help, reflecting the glucose level only at the moment the specimen is taken. In actual practice blood sugar determinations may be done infrequently—possibly every six months or even yearly. It is possible that the stress associated with obtaining the blood specimen may affect the result, causing the reading to be a little higher than at normal times. If the child associates this painful procedure with the daily insulin, serious resistance to the injections may result. These tests become necessary, of course, when coma, dangerous acidosis or other serious conditions develop.

The most important part of follow-up at home is the daily testing of the urine. Testape (Lilly & Company) or Clinistix (Ames Co.) are preferred for practical reasons to Benedict's solution or even to the Clinitest (Ames Co.) tablets. Clinitest tablets may now be purchased wrapped in aluminum foil, but this still does not alleviate the danger of a child's accidentally ingesting them. Another objection to the tablets is that of oxidation. If the lid is left off the bottle, the tablets become useless in a short time and give erroneous results if used. Testape at first gave some handling trouble when picked up by sweaty hands or fingers, but recently it has been improved to the extent that it is practical and accurate enough to use. It is most important to check also for acetone in the urine. This may be done at the same time as the sugar analysis with Acetest (Ames Co.) tablets.

The parent is asked to check the urine for both sugar and acetone four times a day; i.e. before breakfast, before lunch, before dinner and at bedtime. She should keep an accurate chart of the results and is instructed to bring this to the office with her. This record is carefully reviewed with her at each visit. For the first month or two this procedure is followed. As the child grows older, and with satisfactory progress, the tests may be made on only two or three days a week under ordinary circumstances. At the first sign of an infection or other problem four analyses a day are resumed and continued until the child seems as well as usual.

It is not our policy to try to maintain the child free of sugar in his urine. Parents are taught that an insulin reaction is always dangerously near when the urine is kept in a sugar-free state. They come to feel more secure with the margin of safety which a 1+ or 2+ sugar offers.

This seems to be the safest practice when one considers that hypoglycemia can result in irreparable brain damage. Control is adequate if (1) the urine remains free of acetone; (2) there is no polyuria; (3) growth and development are normal; (4) the child and his parents are happy.

Occasionally the NPH or lente insulins require the supplement of some regular crystalline insulin. If the child shows some acetone in the urine or shows a 3+ or 4+ sugar at noon or early afternoon, some regular crystalline insulin should be added to the longer-acting insulin. This may be given in the same syringe during the prebreakfast injection or administered as an extra injection if the situation warrants. If there is nocturnal or early morning acetone or 4+ sugar in the urine, the NPH or lente insulin is increased 2 or 3 units at a time until better control is obtained.

As the child grows into adolescence, problems of independence sometimes occur, and resistance to the acceptance of the disease and its attendant problems of diet and insulin injections must be met. Wise counseling of both the parent and the child, preferably during an office visit when each is interviewed separately, is helpful in avoiding troubles. The period of adolescence often develops into a stormy time for the rapidly growing and changing child. These changes must be met with patience and understanding on the part of the physician and the parents.

At the moment there seems to be no dependable answer to the treatment of diabetes other than insulin. At least three teaching centers in this country have a group of children on oral agents such as phenethylbiguanide (DBI), and some if not most of them are under seemingly good control. It must be said, however, that these children are "new" diabetics and usually have never had insulin. Their progress seems promising, but in answer to a parent's plea for an oral agent it is the general consensus of authorities in the field that they are not yet practical or have not proved their worth for use in private practice.

SUMMARY

The management of the diabetic child demands a careful understanding of the problem on the part of the parent and the physician. It also requires a maintenance of confidence in both that the program for follow-up of the stabilized diabetic child will grant him a normal existence and increased longevity. Every effort should be made to keep the diabetic child free of acetone in his urine, without polyuria, and growing and developing normally.

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DEFECTS OF VISION AND HEARING

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One true test of our competence as physicians for the whole child is demonstrated by our ability to recognize early, evaluate properly, and start the multidisciplined wheels of help rolling for our patients with either visual or hearing problems. We also have responsibilities to the parents of such a child. After recognizing and evaluating the difficulty we must be sufficiently informed to explain the problem in terms that parents can follow—its nature and how it developed, if possible, and, most important, how the child can be helped. Parents of any handicapped child often experience feelings of guilt or shame. Attitudes of rejection or overprotection may follow these reactions. Parental cooperation will often depend upon how quickly we anticipate and efficiently handle these attitudes. To the best of our knowledge we must quickly and honestly attempt to predict the course we expect the deficiency to take. We should attempt to estimate how much it will cost to help the child and know what community resources are available for this help.

The purpose of this paper is to review the clinical aspects of visual and hearing problems in children and to relate how they are handled in a typical urban pediatric practice in a fairly typical city.

EYE DISABILITIES

We use our eyes not only to see, to form visual impressions, but also to express feelings and emotions. Hence any abnormality either in visual function of our eyes or in their appearance may constitute a handicap. Eye disabilities may be classified as follows:

Sighted Children with Eye Problems. This group consists of children with vision 20/70 or better in either eye after correction. It also includes those with eye muscle imbalance problems (strabismus or heterophoria) as well as those with color vision defects, cataracts, cosmetic defects or ptosis.

Partially Seeing Children. These are children who see 20/70 or less after correction, but have enough vision to use sight for learning.

BLIND CHILDREN. These have 20/200 vision or less. The magnitude of this problem is difficult to appraise. The best estimates are as follows: One in 4 United States school children has an eye problem necessitating care (estimated 8.5 million children). One in 500 preschool and school children is classified as partially seeing (estimated 68,000 children). One in 4000 preschool children is blind (5800 children). One in 5000 school children (5600 children) is estimated to be blind.

Causes of Eye Defects

It is often difficult to understand the underlying causes of eye defects. Such factors as heredity, infection and trauma may be responsible. In 1951-2 The National Society for Prevention of Blindness reported 7000 partially seeing children. Forty-nine per cent had difficulties due to refractive errors. Twenty-two per cent had difficulties due to developmental anomalies of structure. Eighteen per cent had defects of muscle function, and 11 per cent had other diseases or defects such as infection, trauma, tumor, or eye problems associated with generalized disease. Of 7000 children who were blind (3000 in the preschool group), 38 per cent had blindness due to prenatal causes, 47 per cent were blind because of retrolental fibroplasia, 4 per cent from tumors, and 5 per cent unspecified. Of the remaining 4000 (school children), 60 per cent had blindness due to prenatal causes, 9 per cent due to retrolental fibroplasia, 11 per cent to infection, 6 per cent to injuries, 5 per cent to tumors, and 9 per cent unspecified. Retrolental fibroplasia has been a main cause of blindness in the past 10 years. This should be reduced in the very near future with better knowledge of the problem and the judicious use of oxygen in premature infants. Loss of sight from infectious diseases is a decreasing problem in this country. Blindness from injury is also on the decline, owing to public education and safety legislation.

Recognition of Eye Defects

Complete ophthalmologic examinations should be done on all premature whose birth weight was less than 3½ pounds. The same is true of infants born to mothers who had rubella in the first trimester of pregnancy or of infants of parents with a history of familial eye disease. One should routinely attempt to evaluate the eyes of newborns, looking specifically for several things. The general facial appearance of the infant should be noted. Look especially for symmetry of the orbits and abnormalities of the lids. The lids should be separated and the conjunctiva inspected, the globe itself visualized. The sclerae are observed for hemorrhages, icterus or blue-white color.

Check the reaction of the infant to the flashing of a bright light. The normal response of blinking, frowning or other withdrawal movements indicates that the infant has some vision in that eye. The red reflex should be demonstrated with the ophthalmoscope set at "0" diopter and held approximately 10 inches from the infant. The presence

of this reflex indicates that the lens is clear. Subsequent well-baby visits offer an opportunity to follow the development of the patient's vision.

Gesell notes that monocular fixation starts in a few weeks and continues to about 16 weeks. After the fifth to sixth week the infant begins to have some binocular fixation. Fusion is weak for the next three or four months, and deviations are frequent. By six months of age a moderate degree of binocular fixation has developed. Convergence and visual following movements are well developed by the third and fourth months. By the fifth to sixth month hand and eye coordination begins to appear. Keeney states that visual acuity at 4 months is 6/100 to 6/70, at 9 months 6/70, at one year 6/60, at 2 years 6/12, and at 3 years 6/9. Macular development is complete at six to seven years. Vision of 20/30 to 20/40 is probably normal for the 4- to 5-year-old group; 20/20 vision is probably not attained until 6 to 7 years.

Children do not usually complain of ocular difficulties, so that one must rely upon observation and history taken from the parents. The presence of red eyes, swollen lids, crossed eyes or nystagmus indicates some difficulty. Look for aimless wanderings of the eyes in infants, unusual head positions, changes while inspecting objects, squinting at distant objects, or unusually close holding of near objects. Visual defects can delay a child's developmental activities and should be considered a possible cause of retarded motor development. In an older school-age child parents and teacher observations on position of reading matter, ability to see work on the blackboard, difficulties with reading or arithmetic, poor alignment of written work, unusual use of color in art classes, and recurring headaches at the end of the school day may all be helpful in detecting visual difficulties.

Visual Screening

It is a policy in our practice to do a visual screening test on all preschool children as part of their school entrance physical examination. We use the Snellen illiterate E chart incorporated with a properly illuminated cabinet at a test distance of 20 feet (Fig. 16) (this is

Fig. 16. Snellen chart in illuminated cabinet. (Courtesy of Green Test Cabinet Co., St. Louis, Missouri.)

the Green Test Cabinet Company model, No. 103). Children who see 20/40 or worse before entry into the first grade should be referred to an ophthalmologist. It is our policy to refer strabismus patients for evaluation as early as possible. Subsequent follow-up is done jointly with the ophthalmologist. The actual management of the ophthalmologic problem is the province of the eye specialist. Nevertheless better parent and patient acceptance of the treatment is attained if the referring physician maintains an active interest.

HEARING DISABILITIES

"My child doesn't answer when I call him from another room." "Why does my baby only smile when she sees me smile first?" "My daughter sits so close to the television and turns the volume so loud. Is that just a phase she is going through?" "My seven-year-old's teacher says he just sits in class and pays no attention to her." "Johnny is four years old, and I can't understand a word he says. Is there anything wrong about that?" "Doctor, since Dorothy had measles, she can't seem to hear too well." "Peter says he can hear the teacher all right, but he can't hear the other children; they recite too quietly." These are typical complaints which are heard by pediatricians. Some hearing impairment could be behind each of them. Listening and talking are so much a part of life and learning that we take them for granted. Few of us realize how much a child who is deaf can miss.

Types of Hearing Impairment

CONDUCTIVE HEARING DEFECTS. These are due to impairment in conduction of sound to the inner ear.

Hereditary. Example, otosclerosis—fixation of the ossicular chain—not commonly seen in children.

Congenital. Malformations that may run the range from minor defects of the outer ear to complete absence of the otic mechanism.

Acquired. (*a*) Upper respiratory tract infections leading to otitis media with injury to the otic mechanism; (*b*) otitis externa with injury to the otic mechanism; (*c*) allergies; (*d*) mechanical obstruction of the ear canal, due to cerumen or foreign body; (*e*) trauma; (*f*) aerotitis with resultant pressure changes which result in conduction difficulties.

PERCEPTIVE HEARING DEFECTS. These are due to disturbances in the inner ear, the auditory nerve, or hearing centers in the brain.

Hereditary. The absence of brain centers, auditory nerve, or the organ of Corti.

Congenital. Infections in utero during the first trimester. An example is rubella or possibly other virus infections at that time. It is possible that high temperatures in the mother have an adverse effect upon the fetal cochlear nerves or auditory cortex.

Acquired. (*a*) Brain damage from kernicterus; (*b*) birth trauma and neonatal anoxia; (*c*) childhood infections affecting the auditory nerve—meningitis, measles, mumps, chickenpox, pertussis, scarlet fever and pneumonia have all been implicated; (*d*) toxic effects of drugs: e.g. quinine, dihydrostreptomycin, neomycin, streptomycin, kanamycin; (*e*) trauma; (*f*) neoplasm; (*g*) cerebrovascular accidents; (*h*) degenerative central nervous system diseases.

Extent of Hearing Defects

The extent of the hearing problem is difficult to determine. Five per cent of school children who received screening tests have enough loss to warrant special study. Between 1.5 and 3 per cent have enough loss to warrant special care and educational help. One tenth of 1 per cent of school children are totally deaf. Degrees of hearing loss are classified as follows:

Mild to Marginal. These children have a loss of 20 to 40 decibels in the better ear. They can hear and learn speech by ear in a good conversational situation, but have trouble at a distance or in a group. They benefit from preferential seating in regular school. Those children who have over 35 per cent loss benefit from amplification by hearing-aid and speech reading training.

Moderate Loss. A loss of 40 to 60 decibels in the better ear. These children can learn speech by ear with amplification and visual aids. They have a limited vocabulary and frequent errors in speech. They may attend regular school with a hearing-aid, but require intensive speech training.

Severe Loss. A loss of 60 to 75 decibels in the better ear. These children have trainable, residual hearing, but require special training to learn to communicate. In each case one must decide whether these children need special schooling or whether they may attend regular school with special help for language and communication.

Profound Loss. A loss greater than 75 decibels in both ears. These children have voices of poor quality and cannot learn language and speech without help. They require early special schooling.

Early detection of hearing loss, especially in the moderate or severe category, *is vital* in order to obtain maximum benefit from training and prevent the development of serious psychological problems. Again, the pediatrician, having the opportunity to see his patients throughout infancy and childhood, becomes the logical one to discover these handicapped children as he encounters them in his practice. By taking careful histories from our new patients and following up our old ones, we can be alert to those children who already have hearing problems or may be expected to develop them. Family history of deafness, complicated pregnancy, labor, delivery or neonatal period—all should make us alert to possible hearing problems in such children. The history of repeated upper respiratory tract infections with otitis media should make us watchful for hearing loss.

Hearing Testing

One can routinely test hearing during the newborn period with a fair degree of accuracy by eliciting the Moro reflex, first by jarring the infant, and then by a sudden loud noise. We can compare the response to both types of stimulation. If the response to sudden loud noise is absent while the jarring Moro reflex is active, we may assume that the child was unable to hear. The oral-palpebral reflex has been utilized. The infant responds to noise by blinking of the eyes. This test is not generally considered reliable, however. At four to six months the child responds to familiar known voices by turning to look.

At 6 to 12 months the child with normal hearing recognizes meaningful sounds. Children from one to two years of age who can hear begin to understand words and have some vocabulary of their own. Older children should be able to follow commands given by someone who is out of their line of sight. Children of the preschool group, age four to six years, who have a mild or moderate hearing loss seem to be more attentive to movement than sound. They seem to watch lips, may show signs of strain at listening, or they may seem inattentive. Their speech may have been slow in developing. They often confuse words with similar sounds. In our office we use a crude method of testing these children. The child is told to stand facing the wall and put a finger in one ear. Simple words are spoken by the examiner at different degrees of loudness, and he is to repeat each word he hears. Simple two-syllable words such as "baseball," "hotdog," "cowboy," "football," "pancake," are used. The examiner's voice is modulated from a whisper to whatever intensity is required to make him hear. This provides fairly good testing for sounds in the spoken range. Higher frequencies are tested by having the child listen to the ticking of a watch or clicking of coins at various distances from the ear.

School children are best tested by audiometric methods utilizing either speech audiometers or, preferably, pure tone audiometers. During 1955 to 1956 in our community in Louisville approximately 40,000 school children were individually tested by the Sweep Check Test. These tests were conducted by the parents, who were trained in the use of the audiometer by the school authorities. Approximately 4 per cent of the children were found to have some degree of hearing loss and were referred to their physicians. In our practice conductive hearing loss, secondary to acute otitis media, is evaluated grossly at the time of diagnosis. Appropriate therapy for the infection is instituted, and we follow them up closely with repeated evaluation of hearing in the infected ear. If hearing fails to improve with resolution of the infection or if there is a history of recurring episodes of otitis media, we refer the patient to an otolaryngologist. In cases in which hearing loss is found without significant ear, nose or throat disease, some element of perceptive or nerve damage may be present. These patients are generally referred to an audiology clinic for complete testing, including psychological tests and recommendations. Upon completion of these tests an educational program is planned for the patient. Our com-

munity is fortunate in having a well staffed audiology clinic, a deaf-oral preschool, as well as special classes for the hard of hearing and deaf in our public schools.

SUMMARY

One of the duties of the child's physician is to recognize, evaluate and arrange for the management of the patient with visual problems or hearing difficulties. So far as the general physician is concerned, these problems and difficulties center around recognition, counseling and referral. These should be sought routinely well before school age. The school child with an undetected visual or hearing problem is at an enormous disadvantage.

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MANAGEMENT OF CONVULSIVE SEIZURES

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Convulsive seizures are symptoms of an underlying disease process involving the central nervous system, whether it be an anatomic derangement or a disorder of physiologic or biochemical processes. They constitute a pediatric emergency and must be dealt with at once in order to prevent damage to the brain.

The first convulsion which a mother sees her child have is a very frightening experience. She has probably never seen one before and is helpless. The physician should see the child as soon as he is called. In the meantime a mouth gag should be used in an effort to provide an airway. Two butter knives can be taped together and wrapped with gauze and placed between the child's teeth to prevent him from biting his tongue. His tongue is then pulled and held forward. If the child is febrile, he should be put into a tub of water which is just cool to the touch. It can then be made slowly colder by adding cold water. An alternative to this, but not as good, is to rub the child with a mixture of alcohol and water (1:2). Continual ice packs to the back, axillae and abdomen are effective. When the child is seen by the physician, the seizures are controlled, and therapy is started to correct the underlying cause when possible.

NEONATAL CONVULSIONS

These are due to inborn brain defects, both trauma or anoxia, infection, and metabolic defects. Since newborn infants are frequently dismissed from the hospital with their mothers within a day or two after birth, convulsions from these causes may not be detected until the child is home. The first sign of trouble may be cyanotic spells which eventually develop into frank convulsions. A history of the pregnancy and delivery is important. One needs to inquire about such things as resuscitative measures at birth.

Physical examination should include investigation of such things as the condition of the fontanel, stiffness of the neck, pupil size and equality, muscle tone and the reflexes.

Frequently convulsions in the newborn or older infant go unrecognized by the uninitiated. The infant may lie with his head to one side, arms and legs extended, with short, almost imperceptible jerks and lateral nystagmus. Feedings are not taken. Generalized, more extensive jerking or localized seizures are easily recognized. These infants should be given anticonvulsant therapy and hospitalized for study.

The infant is particularly susceptible to sepsis from birth until two to three weeks of age. A poor feeding history, vomiting, excessive sleepiness or "jitteriness" should make one suspicious of generalized sepsis, including central nervous system involvement. These infants are often afebrile and may have normal blood cell counts. They should be hospitalized.

If seizures occur in the newborn after he has seemed normal for a few days, he may have tetany or some other metabolic defect and should be hospitalized for study. Older infants, those up to the age of one year, who have seizures without evidence of infection (pyogenic, viral, tuberculous) or lead encephalitis should be suspected of having had intrauterine trauma to the central nervous system or developmental defects.

The outlook for a normal developmental pattern is poor when seizures are due to developmental defect or trauma, subdural hematoma having been ruled out. In the newborn intramuscular injections of phenobarbital sodium, ¼ grain, repeated once in 30 minutes and then every 4 to 6 hours as necessary, plus Dilantin, ⅜ grain orally daily, usually control the seizures. After a day or two the phenobarbital is given orally.

Parents of these infants require much time and patience. The physician must explain the mechanism of the seizures and give a guarded prognosis. I know of no condition in pediatrics in which more time must be spent with parents, repeating the same thing over and over again. It is frequently a good plan to suggest having another professional opinion.

Phenylpyruvic oligophrenia should be considered and investigated in any infant who is blond, whose sibling has the disease or is retarded, or in one who has eczema and associated abnormal behavior or convulsions. Testing should be done after three weeks of age. Ferric chloride solution, 5 or 10 per cent, is dropped on a recently wet diaper. A green color indicates phenylketonuria. With normal urine the color remains yellow. The test tube test is performed by adding 3 drops of the ferric chloride solution to 1 cc. of urine. A green color is positive. If the ferric chloride test is positive, it should be confirmed by the phenylhydrazine test. Treatment is directed toward reducing the phenylalanine content of the diet. Meade Johnson's Lofenalac and Merck's Ketonil are food preparations which meet this requirement.

CEREBRAL PALSY

Seizures may occur in infancy before spasticity is detected. The management of these convulsions is the same as for all other varieties.

FEBRILE CONVULSIONS

Febrile convulsions are rare before the age of six to eight months and occur up to four years. The child has been previously healthy and has a fever of at least 102° F. rectally, but often higher. The seizure lasts less than 30 minutes. He is usually normal neurologically when the seizure is over. Febrile convulsions are due to any infectious process or occasionally hyperthermia, such as that which may be encountered in a poorly ventilated croup tent in which the high environmental temperature plus the infectious process causes high fever. Injections of vaccines may also cause convulsions. These may be secondary to the fever, but may rarely be caused by encephalomyelitis. It is not so much the etiologic agent which causes the seizures, but rather the sudden rise in body temperature in a susceptible child. Convulsive seizures associated with meningitis are due to this disease and not to the fever.

If the child is still having convulsions when he is seen by the physician, they must be dealt with at once. Any of the following procedures may be followed in an effort to stop the convulsions.

Intramuscular paraldehyde, 1.5 cc. per 10 pounds of body weight. Give deeply into the muscle and not more than 3 or 4 cc. in one place. Repeat with half the dose in a half-hour if necessary.

Phenobarbital sodium, 30 mg. per 10 pounds of body weight, intramuscularly. Repeat with half the dose in a half-hour if necessary. It must be remembered that barbiturates are respiratory depressants.

Capsules Nembutal or Seconal, ¾ grain for 6 months to 1½ years, and 1½ grains from 1½ to 4 years, emptied in 2 drams of water and injected into the rectum with an enema syringe, holding the buttocks together for 10 minutes.

If the seizure is still uncontrolled, consider (*a*) open drop ether, (*b*) paraldehyde, 20 cc. dissolved in normal saline solution, and given intravenously through a drip until control is attained.

Sodium Amytal is mentioned only to be condemned because of the small margin of safety between control of convulsions and serious respiratory depression. It is most effective in experienced hands.

Other temperature control measures are instituted as soon as the initial sedatives are given.

Medications to lower the temperature are given as follows:

Thorazine intramuscularly or by suppository; 5 mg. intramuscularly for infants to 10 mg. for 4-year-olds. Suppositories, 12.5 mg. for infants to 25 mg. for 4-year-olds.

Aspirin by suppository (not as good as Thorazine). The dosage for infants to 4 years is 2 to 5 grains, but do not repeat for 6 hours.

Pyralgin (Savage Pharmaceutical Company), intramuscularly, 0.5 cc. for infants to 2 cc. for 4-year-olds (do not give with Thorazine, since it may cause hypothermia); or drops, 0.5 cc. for infants to 1 cc. for older children; or syrup, ½ to 1 teaspoonful for infants to 6 years of age.

Pyralgin and Thorazine have been found to be the best of the antipyretics. The former is being used with increased frequency at the Children's Hospital in Louisville for pyrexia and thus far has been

the most effective of any drug. No unfavorable effects are encountered when it is given in recommended doses as needed.

The child will have more convulsions unless the body temperature is lowered and kept down. Sometimes it is necessary to hospitalize him in order to carry out adequate temperature control measures.

When the febrile seizure is under control, the child is examined to determine the cause. If physical signs and a urinalysis are of no help, an examination of the spinal fluid is indicated. The appearance of the fluid should be noted. Then a cell count, examination of sediment and a culture should be done. Bacterial meningitis and viral or lead encephalitis frequently *do not* cause neck stiffness for several days in infants. A seizure due to meningitis is often preceded by a period of sleepiness with fever, which is unusual for the child.

Once a child has a febrile convulsion he is vulnerable to them each time he has fever. The parents should be informed of this. A prescription of Nembutal suppositories, ½ grain, no. 10, is sent home with instructions that one should be inserted into the rectum when fever over 101° F. rectally develops, and every 8 to 12 hours thereafter if necessary according to age. Pyralgin should be given for one dose only at the same time, and the child should be seen by the physician as soon as it is practical to do so.

If the child gets three or more pyrexial attacks with associated seizures, it is well to put him on continuous phenobarbital, ¼ to ½ grain twice or 3 times daily. If this does not control him, Dilantin, ¾ grain daily, should be added. It is interesting to note that the incidence of idiopathic epilepsy is uncommon in children having uncomplicated febrile seizures. When there is a history of epilepsy in the family, the incidence is higher.

Children under three years of age sometimes have residual paresis following convulsions. These are probably due to small vascular accidents and usually, but not always, clear up without residuals.

Unless the etiology of the convulsive seizure in the infant is certain, electroencephalography is indicated and may be helpful. It is especially so in *hypsarrhythmia* (massive spasm), which occurs most frequently between the third and twelfth months of life, but has been seen from one day to three years of age. It is characterized by sudden jerking or body flexion. The arms are flung out and the entire body shakes. The electroencephalogram is usually diagnostic. Severe mental and physical retardation results unless the seizures are controlled. Steroid therapy seems to be helpful in the treatment of this type of seizure.[1]

THE EPILEPSIES

The chief goals in the treatment of seizures are (1) control of the convulsions, while at the same time not causing such side effects as to prevent the child from leading a reasonably normal life, and (2) lack of toxicity in effective dosage. Usually two or more medications are combined, each in a dose below that causing undesired reactions because of the frequent toxicity of the most useful drugs alone in effective dosage.

Grand Mal

Usually a parent calls the physician, telling him that his child has had a seizure, either at school or while playing. It lasted for a few minutes, and after a period of sleepiness he seemed normal. Sometimes, upon awakening in the morning, the tongue has been bitten and is bleeding. An appointment is made by the physician for a general unhurried examination. A careful history is taken from someone, if possible, who was a witness to the seizure. One inquires into the family history of convulsions in a casual manner, preferably in the presence of only one parent at a time. Nothing is gained by having a parent maintain a feeling of guilt about his being the carrier of disease.

After a careful physical examination routine laboratory procedures such as blood cell count and urinalysis are done. If it is decided that the electroencephalogram is indicated, this should be arranged about two weeks after the seizure. It is necessary to explain to the parents that this is advisable in order to get a true tracing. It must be realized that this period is going to be one of much apprehension to the parents, and they should be given as detailed an explanation of the findings as possible. They should be told of the limitations of the electroencephalogram.

If the child has had only one short grand mal seizure, he may never have another. It is perhaps best to wait until he has a second seizure before beginning therapy. "Science and Seizures" by William G. Lennox is recommended reading for parents.

If the child is seen during a seizure or during status epilepticus, he is treated as outlined under Febrile Convulsions.

When grand mal has been definitely diagnosed and treatment decided upon, the problem is discussed with the family in the child's presence. There must be some restriction of activity. The child should not ride a bicycle or go swimming unattended until he has been seizure-free for at least one year. Tablets of phenobarbital, ¼ to ½ grain 2 or 3 times daily, are prescribed. It is well to start with a small dose for 4 to 5 days and then increase to ½ grain or even a higher dose if it is not too sedative. Occasionally excessive irritability results from phenobarbital. If this occurs, Mebaral may be substituted. In addition to the barbiturate, Dilantin is prescribed. We begin with ¾ grain daily and increase as needed to tolerance. Ataxia, nystagmus, diplopia and lassitude indicate overdosage. The drug should be stopped for three days and then resumed with a smaller dose.

The parents should be told to watch for the development of a rash one to three weeks after Dilantin therapy has been started. At first the rash is scarlatiniform and then becomes morbilliform. Exfoliative dermatitis may result if medication is not discontinued at once. Fever to 103° F. and glandular enlargement may accompany the rash and may persist for several days. The patient who has such reactions cannot take Dilantin again. With mild rashes and no fever Dilantin may be tolerated again after the drug has been discontinued for a few days. Other adverse side effects are hypertrophy of the gums and hirsutism.

There is no way to overcome these effects except by discontinuation of the drug. This should not be done, however.

Mesantoin may be substituted for Dilantin if seizures continue when both phenobarbital and Dilantin are administered to tolerance. Mesantoin, however, is more toxic than Dilantin, causing rashes and depression of the bone marrow. Mysoline may also be tried if the other medications fail, adding it to the phenobarbital and Dilantin in increasing dosage to tolerance.

It is important not to discontinue all medications at one time if they are not entirely effectual. The patient may then go into status epilepticus. Start a new drug before discontinuing the old ones.

If control of the seizures is still not satisfactory, the patient should be referred to a neurologist.

Patients are kept on medication for five years. Medications are gradually discontinued over a period of one to two years if the seizures have been under control for this period. Medication should be continued indefinitely if there is an occasional seizure.

Petit Mal

Petit mal is characterized by sudden, brief loss of postural tone. Eye staring and unsteadiness, with only momentary loss of consciousness, may occur many times a day (often 200). It occurs in children and usually disappears by the age of twenty. Attacks may be produced in the office by deep respirations.

Akinetic Attacks

Akinetic attacks are manifest by the patient's dropping to the floor, or he may only "slump" a little. There may be sudden head nodding. In myoclonic seizures the patient stops, stares and jerks his head, eyes and hands about three times a second. Such seizures as these are best referred to a neurologist for management.

If the attacks of petit mal are seen by the physician or a good witness, the child is completely examined, and a blood cell count, urinalysis and electroencephalogram are obtained. Phenobarbital is begun in small doses and increased to tolerance. Tridione therapy is instituted. At first one capsule is given in the morning for four days. The dosage is gradually increased by one capsule until the attacks are controlled. As many as nine capsules daily may be given. If the seizures are not controlled with this dosage, a Paradione capsule can be substituted every fourth or fifth day for a Tridione capsule. If the Paradione is not effectual, it is discontinued, and Milontin is substituted.

As with all drugs for the control of epilepsy, the patient must be carefully watched for toxic effects when he is receiving Tridione or Paradione. Tridione causes rash and sensitivity to light. Leukopenia sometimes results from this drug, even after many months of therapy. Monthly blood cell counts should be performed and the drug discontinued if leukopenia develops. Nephrosis has also been reported with

Tridione. Urinalysis should be a part of the follow-up examinations. Paradione causes the same side effects as Tridione, but to a less degree.

When there are grand mal and petit mal attacks combined, the more severe type is treated first. Phenobarbital is started and pushed to full dosage. Tridione tends to aggravate grand mal attacks. Consequently, Milontin, 10 to 20 mg. per pound per day, is prescribed to control the petit mal. If the grand mal attacks get worse, Mysoline, 6 to 12 mg. per pound per day, is added, since Dilantin tends to make the petit mal worse. The toxic effects of Mysoline are drowsiness, ataxia and rashes.

Medications for petit mal should be continued until the child is seizure-free for six months. Medications are gradually reduced, keeping the full dosage of phenobarbital till all other medications are stopped. The dosage of phenobarbital is reduced to discontinuance in a year.

Although a large percentage of youngsters who have grand mal and petit mal attacks are well controlled, there are a great many in whom the control of these seizures constitutes one of the greatest challenges in neurology. This is even more true in the other varieties of seizures. The many new drugs being put on the market are an indication of this unfortunate state of affairs.

SUMMARY

Convulsive seizures are due to central nervous system disorder, anatomic, physiologic or biochemical. Treatment is directed toward the cause when possible. However, seizures are frequently associated with fever or are a form of idiopathic epilepsy. Their management has been discussed.

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TREATMENT OF IDIOPATHIC GRAND MAL EPILEPSY

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At the time of the diagnosis of idiopathic grand mal epilepsy the physician should have a detailed discussion with the parents of the affected child. If the patient is old enough to understand, he should also be present for this discussion. The physician must be careful to use only terms that are understood.

At this time one of the physician's most important duties is to allay the many misconceptions about the cause of epilepsy and the prognosis, subjects which most parents fear. An outline of treatment can then be given.

It is our policy to start both diphenylhydantoin sodium (Dilantin—Parke, Davis) and phenobarbital when treatment is first begun. This dose is estimated upon the following basis:

Birth to 40 pounds—Dilantin Infantabs, 100 mg. daily, and phenobarbital, 30–60 mg. daily.
40 to 80 pounds—Dilantin Infantabs or capsules, 200 mg. daily, and phenobarbital, 60 mg. daily.
Over 80 pounds—Dilantin capsules, 300 mg. daily, and phenobarbital, 60–90 mg. daily.

This scale is an artificial one and will not be applicable in many patients.

The parents should be advised to expect drowsiness for one or two weeks. They should be instructed to report any persistent dilatation of the pupils, nystagmus and staggering gait. A month after onset of treatment the patient should be examined for these signs of toxicity and for changes in the deep tendon reflexes. The parents are also told to record the date of any convulsions and their duration. At the time of this first follow-up after a month of treatment the medication is increased to tolerance if the patient has continued to convulse and has shown no signs of toxicity. If seizures continue even though Dilantin intoxication has occurred, the phenobarbital dosage is increased to tolerance. However, the increases in dosage of phenobarbital should not

be made at more frequent intervals than once each week. Other drugs should be added if both Dilantin and phenobarbital have been increased to the point of toxicity without control of the seizures. Primidone (Mysoline, Ayerst) in a daily dose of 125 to 500 mg. may be added or substituted for the Dilantin. Changes in dosages more frequently than at monthly intervals are usually unnecessary and probably not warranted.

Allergic reactions to any of these drugs may occasionally occur. Dilantin allergy generally appears about two weeks after the onset of therapy. It is manifested by a pruritic, measles-like eruption and can, in rare instances, lead to an exfoliative dermatitis. It is uncommon, however, to have any type of allergic reaction to Dilantin. Those who have poor oral hygiene are likely to have gingival hypertrophy after taking Dilantin. This is especially true of patients who have cerebral palsy. It may require oral surgery if severe enough. Hypertrichosis is also a bothersome side effect in some patients.

These children should be kept on medication continuously for three to five years after the last seizure. They should be followed up at intervals of one, three and then six months, keeping in mind the fact that as the child grows he needs larger doses. It is generally wise to inform the parents that the dose need not be spread out over the day, but may be given all at one time, probably best at bedtime. Parents should be definitely and firmly instructed that these drugs should be given regularly and without interruption.

When you decide to discontinue the drugs, they must not be stopped abruptly. Rather, they should be withdrawn by "weaning" one drug at a time, Dilantin first, over a period of one or two years.

A word of caution about accidental poisoning is in order. Anticonvulsant drugs should be kept out of reach of all children. Accidental poisoning due to carelessness in this respect is far too common.

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COUNSELING PARENTS OF RETARDED CHILDREN

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Mental retardation is a condition that confronts the physician much more frequently than is generally expected. Three per cent of the total population in the United States has an intelligence quotient of less than 70, which is dull normal. When the total number of people affected by a retarded person, namely the parents, one or two siblings, grandparents and other relatives, is added to this, the magnitude of this problem becomes evident. Unfortunately, many of those involved become so disturbed by the retarded child that they become ineffective in our society. The physician today is responsible not only for medical care of patients, but also for their emotional and social welfare. He must treat the retarded child as well as the whole family. Bearing in mind that mentally retarded children can be helped, it is the physician's responsibility to recognize their problems and provide service for these patients and their families.

The parents of a retarded child are aware of his deficiencies even if they do not admit it. They are looking to the physician for the answers to certain questions. What is really wrong with my child? Why? What did I do wrong, and whose fault is it? What can I do to help him now, and what shall I be able to do for him in the future? Where can I get the help that I need?

The answers to these questions are not simple. Even if available, they will not necessarily be accepted immediately unless they are presented in the right way by the right person at the right time. This does not imply that parents of retarded children are so disturbed that they are oblivious of good advice. But parents need to recognize certain qualities in their physician before being able to accept counseling and instructions. The physician must be understanding without being too sympathetic. People resent the expression of too much pity. He must be able to put himself in the place of the parents and talk with them, not down to them. Honesty with parents is essential, but it must be accompanied with kindness. Parents need to know that the physician

is thorough and reliable and that his interest in the child is genuine. They must know that the physician will be available in the future to help them with their decisions.

The examination of a retarded child requires extreme patience and the understanding that a child will react according to his mental and social age and not like a child his age physically. One should do a complete physical and neurologic examination, preferably in the presence of the parents so that they can reassure the child if he is frightened. This has an added advantage of convincing the parents that no detail is being overlooked. Such laboratory work as is indicated is also performed.

After the examination the findings are discussed with the parents in terms of what further consultations are needed, and arrangements are made for them as needed. Parents do not expect a physician to be an expert in all phases of medicine, education and psychology. Their respect for the physician is increased if he is honest and recognizes his own limitations.

When all the reports are assembled, the parents return for a conference. If a definite diagnosis can be made, it is fully discussed. If the diagnosis is not specific, the parents will accept this, particularly when they are aware of the thoroughness of the examination and the honesty of the physician. The etiologic factors are discussed, giving the parents opportunity to express any feelings of guilt which they might have. It is extremely important for the physician to help the parents clear up any misconceptions which ignorance, superstition and misunderstanding may have created. Genetic factors and the advisability of future pregnancies are discussed. The parents' ego can be lifted by an accepting physician, and it is essential for the parents to have a good attitude toward themselves in order for them to be able to help their child in the future.

At this stage of the conference it has been my practice to discuss with the parents their responsibilities to their child regardless of his physical or mental condition. Indirectly I try to get them to accept a philosophy which places the child's happiness as the ultimate objective or goal. Health, wealth and intelligence do not imply happiness. Being accepted and loved is far more important, and being given the opportunity to use one's physical and intellectual abilities to capacity without being pressured provides the basic elements needed for happiness. Security is the final real need.

This security can be given to a mentally retarded child as well as to a gifted child when parents learn the child's capabilities and accept them. Parents should not try to make a child be what he cannot be or prevent him from becoming what he would like to become. In other words, being accepted for what he is gives the child a sense of love and security. Unhappiness will follow if a child is placed in a situation to which he cannot adjust. Agressiveness, hyperactivity and destructiveness are the results of attempts of a child to cover up his deficiencies, to gain attention and recognition, or to rebel against too

much authority. Shyness and isolation are apt to be the other extreme of behavior.

Planning the future with parents who accept this type of philosophy is simplified. It is essential for the physician to be aware of all the local and national facilities available and to be able to assure the parents that their child will be guided to the proper resource as the occasion arises. When any plans are formulated, they must be primarily for the child's sake and not the parents'. The child's happiness is the ultimate goal, and the physician, although aware of the parents' feelings, must take the child's side. Actually, parents are delighted to have a responsible person control their child's future and to feel assured that they will never say, "I wish I had . . ." If institutionalization is eventually indicated, parents will accept this more readily and with less feeling of guilt, knowing that it is for the child's happiness and not to relieve them of a burden.

The specific facilities or resources will depend upon the local community. It may be depressing to know what should be done and not have the services available. This must not be used as an excuse to drop a case. Instead, it should stimulate the physician to help get the community to provide the needed services. Local and state Health Departments can be helpful, but one of the best resources is the parent groups. The National Association for Retarded Children has many state and local chapters that can be of infinite value. They can supply literature and information, but more important, a group of parents with similar problems gives individual parents a feeling of acceptance. They have someone with whom they can talk over their problems and get the benefits of their experiences and techniques. They have an acceptable outlet for the release of feelings and emotions.

The financial aspect in reference to the future care of the child is a tremendous burden which these parents must face. They are fearful of what will happen to their child after they are gone. Few parents are aware that social security benefits will be received by a retarded child throughout his lifetime. This, plus a planned insurance program, will relieve this anxiety-producing problem and permit the parents to face their other problems more freely.

Each physical defect of the child should be corrected so far as possible. Those which cannot be corrected at once should have plans made for future attention. Return visits, re-evaluation and future planning provide the parents with the security they need. The assurance that no detail is overlooked physically, educationally or emotionally will deter these parents from making the fruitless rounds of doctors and clinics and make this otherwise potentially ineffective family a happier and more productive one.

SUMMARY

Part of the practicing pediatrician's duty is to recognize and direct the management of the retarded child. This is accomplished through coun-

seling and advising parents. In order to be able to do these things the physician must be familiar with the agencies through which he can secure help. However, his success will be directly related to the understanding which he demonstrates by word and action toward the family and its problems.

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COUNSELING PARENTS OF THE MONGOLIAN CHILD

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It is becoming more evident that many of our thoughts and ideas about the mongolian child and his family have been in error. The past 10 years have shown evidence of an increasing vogue for institutionalizing infants with mongolism in the newborn period.[2] It is noteworthy that during the same period there has been an increasing awareness of the importance of the mother-child and family-child relations in the early years of life. As one can see by the early tone of this article, a plea will be made for a normal environment for the mongolian child, with a few exceptions as indicated later.

THE NEONATAL PERIOD

With improving medical education it is becoming increasingly common to diagnose mongolism during the newborn period. Nowadays it is not unusual for the nurse in the newborn nursery to suspect the diagnosis. The typical clinical appearance is known to all physicians dealing with infants. To help confirm the diagnosis palmar dermatoglyphics should be done as well as x-ray studies of the pelvis for angle measurements.[1] These may be of great aid in establishing an early diagnosis. One must remember, however, that before final diagnosis is made, consultation should be obtained whenever feasible. When the physician sees a newborn with mongolism, he should tactfully inform the parents that he is worried about the infant and state that consultation is indicated. After this the parents should be notified of the diagnosis. This should all be done with reasonable expedience.

It is during this early phase that the art of medicine is important. The physician must be understanding and patient. He should explain in simple but straightforward terms the potentialities and training possibilities of these children. It should be pointed out that these children are especially loving and lovable during the infant and childhood years. They are easy to care for. Of great interest for discussion

might be the recent studies reported by Centerwall and Centerwall.[2] They showed that mongoloid children cared for at home during the first two and one-half years or more of life attained an intelligence quotient (average) in the trainable level. Children who were placed away from home in the neonatal period attained an intelligence quotient (average) in the untrainable level. These studies were on children with an average age of seven years who were in a state institution. There was also the same type of difference in the social quotient, and in physical growth and development.

EARLY YEARS

The child should be given routine examinations and immunizations. Counseling must be oriented to the patient's needs, potentialities and limitations. Parents should be encouraged to use their own resources and ingenuity to stimulate the child to undertake greater self-care and self-reliance. One should emphasize the everyday problems of self-care.[5]

We must keep in mind that improper counseling in these early years can lead to serious emotional difficulties in the parents and other members of the family in later years. The child should be discussed as an individual. Avoid labeling the child as much as possible. In other words, after initial discussion with the parents about diagnosis, do not say, "He is doing well for a mongoloid." Rather, speak of Johnny himself.

It is during these early years that questions of future plans for the child will be raised by the parents. Such questions will occur with more frequency as the parents notice other children surpassing their handicapped child physically and mentally. Special schools should be discussed. Most public school systems will have special classes or a school for day students. The parents, if interested, should be informed of boarding schools. There are many excellent residential schools throughout the nation.

PHYSICAL WELFARE

Associated physical anomalies should be cared for just as would be done for the average child. Most common of course are umbilical hernias and interatrial septal defects. Respiratory diseases are common. These children are definitely more susceptible to these ailments, but respond to the antibiotics as do most children.

SEXUAL ACTIVITY

Mongoloids are generally considered to be sterile, although a rare few have borne children. They tend to be much less active sexually than other persons. Sexual aggression by older mongoloids has not been observed. Sexual activity has been most pronounced from ages 15 to

24, but after this there is a gradual decline. Children in the school years can easily be trained away from these desires.

EFFECT ON SIBLINGS

Many physicians have suggested that, if the diagnosis can be made at birth, as it frequently is, the infant should be separated from the family at once—indeed, the mother should not even see the infant.[5] Here the siblings, "the other children," enter the picture. The feeling has been, "Let's spare the other children embarrassment and shame." Many families have made severe financial sacrifices for years because of this type of thinking.

But let us examine family situations in actual practice. One child in my practice is now 4½ years old. There are 2 older siblings in the family, a 12-year-old girl and a 17-year-old boy about to enter college. These children love their little brother. They fully know he is retarded. They themselves lead normal lives and have a greater depth of understanding for all sorts of mental and physical abnormalities in others. Sister Mary Theodore, O.S.F.,[4] brings this point out very well in describing actual family histories. These children are usually contented and rather affectionate and not often subject to behavior disturbances. It is readily seen why they often can live in a family unit where love and consideration for each other permeate the household.

PRESCHOOL YEARS

Much can be accomplished in the preschool years. Training in cleanliness and self-care is essential. Good habits are taught by good example. "No amount of words used for instructional purposes can have the force of example which will ever remain the most eloquent form of teaching."[4] Naturally, toilet training will not come as early as with other children. But, with patience, habits will be established. Consistency and firm kindness will bring results. It is more important to realize that the child should be met at his own level. He will perform below his capabilities when less than this is expected of him. When more is expected, he will become frustrated. This could lead to emotional problems, especially stubbornness. Often a sign or word of approval for something accomplished will give support to the sense of one's own worth. So often one is inclined to criticize lack of accomplishment. Goals should be set for each performance. Tiny goals can often be set in order to attain the final goal. For example, brushing the teeth: first hour to hold the brush, second hour how to apply the toothpaste, and so on. Perform the acts with the child during this preschool period for perhaps two or three hours several times a week. Many communities have such nursery schools for retarded children.

We must always keep in mind that there will be some families who are not capable of carrying on this type of program. There may be many reasons for this—emotional factors within the family, economic

factors, and others. The parents may not want the child. There may be indications for institutionalizing the child. The parents' desires should be respected.

SCHOOL YEARS

For many years there was a deep-seated impression that the monogolian child could not be taught. Now we know that the degree of retardation varies considerably and that the trainable mongoloid can be well adjusted in a classroom situation. As has been pointed out earlier, the percentage of trainable children can rise greatly if there is a family environment during infancy and the preschool years. These children are very happy in school. Some of them achieve surprisingly more than is expected, thus giving a hopeful outlook for others.[2]

School-wise, there are three possibilities for these children: (1) school at home, (2) special day classes, (3) the residential school.

School at Home

This plan calls for a tutor to come to the home-bound child. Individual teaching is adjusted to the child's assets rather than his liabilities. This program is best if it is only introductory rather than a long-term arrangement. Frequently this initial instruction is an excellent preparation for the child's later adjustment to a more formal school program.

Special Day Classes

"Where can we send Johnny to school?" This question arises when the child is ready to leave the protection of the family and home. Not too many years ago there was little to suggest, but today almost every large community has a special school for retarded children. In some areas they are part of the school system. In others they are fostered by such organizations as the Council for Retarded Children. Much can be taught to these children even though they have a short attention span. The learning that satisfies a present curiosity and the thinking that solves current problems are preferred to experiences which depend upon remote, postponed and general interest for their meaning. These children can be taught to perform many menial tasks and household duties. Their aptitudes lie in the direction of service to others. I know of one young adult mongoloid who does the shopping at the local stores for her family.

The Residential School

Even with the best of intentions there are times when it is not satisfactory to care for a retarded child at home. When this situation arises, a qualified residential school offers distinct advantages. No retarded child is comfortable in a school where the environment fails to reach

him on his level of comprehension and experience. The mentally handicapped share in the natural, human desire for recognition. In some family situations it may be best to advise a residential school. Sometimes the other children suffer because of the attention showered upon the handicapped child. At other times the anxiety created by the problems of a retarded child in the home becomes almost an obsession with the parents. He may often have only to remain a few years at the school, and when he returns to the home, both parents and child are better adjusted for the future years. During the residential school years the family should visit the child at school and the child should come home for vacations. As he progresses these visits bring much satisfication to all those involved.

In this age of atom bombs and sputniks it is easy to lose perspective. The pendulum is now swinging to the education of the intellectually gifted child. Let us not forget that in God's eyes all children are deserving of the opportunities commensurate with natural abilities.

SUMMARY

The mongolian child should be managed with emphasis upon whatever assets he might have. These may include more or less trainability and a naturally affectionate nature. Such qualities can be developed best within the family group, and decisions to institutionalize these children must be highly individualized. They, like normal children, thrive upon care and attention.

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FAULTY POSTURE

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Faulty posture in the child is sometimes a serious problem which will influence his future health and life and will need careful, intense treatment. Often, however, the child is brought to the physician by overanxious parents for postural deviations that are actually within the normal developmental range. In those who do have true malposture, one can usually find overt signs of an associated physical lesion such as muscle paralysis or weakness, bone and joint deformity, malnutrition or actual disease. A true malposture is also often found in the emotionally maladjusted or psychotic child.

Posture is the result of the interrelation of parts of the body in their over-all reaction to the pull of gravity. Thus the uncurling of the body of the newborn from the fetal position and the functional development of the infant in assuming the erect position from the horizontal are related to gravitational force. Those children who are immobilized in a static horizontal position due to mental or physical disability will develop skull, thoracic and pelvic deformities because of plasticity of bone. This postural deviation will need the attention of the physician. He should give the parents instructions for position management. Normal children ordinarily need no supervision in the horizontal position. As the erect position is assumed, the child must be observed for postural deviations while standing and walking. Unless corrective procedures are applied to serious postural deviations in the child, deformity will develop or, if already present, become aggravated. The deformity will be irreversible in adulthood.

It is not my plan to discuss complete criteria for the differential diagnosis or the treatment principles for all the various postural faults or conditions that produce them in this short presentation. The discussion will be limited to the two most common postural deviations: namely, anterior-posterior and lateral deviations of the spine and their associated abnormalities in other parts of the body. It is hoped, however, that the physician will be stimulated to examine the child in the nude in the various postural positions and be able to identify normal from abnormal posture by clinical observation.

By parental and/or patient reassurance in the normal and further

investigation of the abnormal, the physician should be able to manage most of the common postural problems. He should be able to determine the kinesthetic dynamics at work in most cases of postural deviations. Recognition of the cause should then lead to measures for correction. An attempt will be made to illustrate measures that can be carried out in the physician's office. These will include some diagnostic principles as well as some corrective procedures to overcome problems related to muscle imbalance, soft tissue tightness and other deforming forces which lead to faulty posture.

IDENTIFICATION OF POSTURAL DEVIATIONS

Average Posture

As Wiles[15] pointed out, there is no true normal posture any more than there is a normal body weight. Nevertheless the clinician must have in his own mind an average posture for children at various ages, keeping in mind the normal developmental processes in the growing child. Figure 17 illustrates six examples of acceptable posture at various ages.

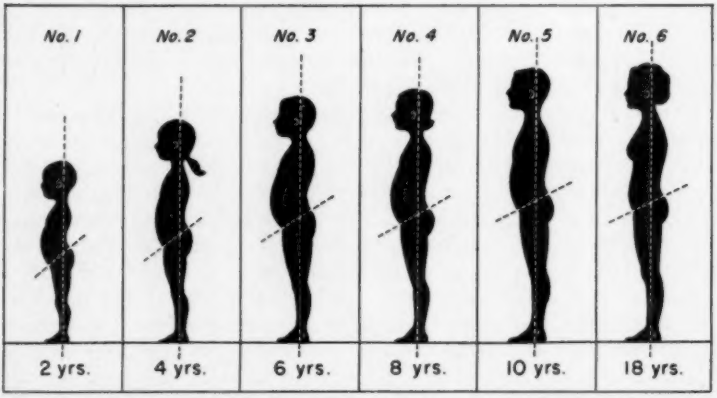

Fig. 17. Silhouette copies of photographs of children of various ages who were considered to have acceptable posture. These illustrations are not drawn to scale. The apparent kyphosis at ages 6 and 8 years is caused by scapular winging, which is commonly seen at these ages. The relative pelvic tilt is illustrated.

Identification

When examining the child in the erect posture, one should view the body from the side as well as from the back and front. The general posture of the child should be observed while he is doing functional tests such as heel walking, toe walking, squatting and tests for back mobility. In addition, one should watch the child in normal ambulation and look for limp, muscle imbalances, mannerisms and the attitude of the patient.

Although the erect posture is maintained by postural reflexes and is continuously changing and maintained by muscle contraction, the body is constructed so that it attempts to assume a position which takes a minimum of muscular effort. As a result a major portion of the load of body weight is borne by the skeletal system. Deviations of weight bearing on the foundation, i.e. the feet and the legs, will cause further deviation of the structures above in order to maintain the skeleton in a weight-bearing alignment.[4] Likewise, deviations of superstructures will be a reflection of abnormal adaptations of the limbs and feet below. In the otherwise healthy child, muscle relaxation, weakness, or soft tissue structure tightness can easily throw this fine body alignment into positions of stress and strain.

Anterior–Posterior Curves. As viewed from the side, posture is considered "normal" or average[5, 13, 15] when a plumb line dropped from just behind the external auditory canal falls in line with the hip joint, or just posterior to the center of the joint, just anterior to the knee joint and anterior to the ankle joint (Fig. 17). Most authorities accept a normal variation from this "average posture," especially in children, and individual variations are considered just as normal as variations in personality traits.[1]

The inclination of the pelvis and the postural position of the hips are usually considered the key to good posture.[5, 13, 15] The anterior-posterior curves of the spinal column above this point should be arranged so that the line of gravity intersects with the spinal column at the cervicodorsal and lumbodorsal junction and at the same time falls in front of the sacroiliac articulation.[13] The relative position of this line can be fairly accurately judged by the experienced examiner without the aid of radiographic analyses for bony landmarks. In this correct posture the legs and feet should be considered the foundation of the whole body structure, and the knee cap should face forward, indicating that there is neutral rotation of the femurs. The feet should be slightly abducted with the toes pointed straight ahead. The weight is borne on the outer borders of the feet with an adequately maintained medial longitudinal arch and straight calcaneal weight bearing.

When viewing the erect child from the side, one must note in particular the anterior-posterior curves of the spinal column. The most common faulty posture deviations in children are associated with what is called the relaxed position, i.e. with an increased cervical lordotic curve, increased kyphotic curve, increased lumbar lordotic curve, increased pelvic anterior inclination, internal rotation of the femurs and possible associated pes planovalgus with internal rotation of the foot and calcaneus. If there is no great accentuation of one or more of the foregoing deviations and the line of gravity still falls within the acceptable position in relation to the structures named above, one can safely assume that as the child develops and grows, and is normally active, he will correct most of these faults.

For instance, when examining a two-year-old child who is just beginning to accomplish adequate balance in the upright position, one must keep in mind that during the sitting phase of the child's development he sat with his spine in a more or less convex position with the

hips flexed. Because of the early development of strength in the erector spinae group of muscles, with a relative weakness of the abdominals, the child will be exposed to the pull of gravity when he assumes the erect position and will attempt to resist by efforts to maintain balance. One will find that he soon assumes a lumbar lordotic position with a slight convex thoracic spine (Fig. 17, example no. 1). As time passes he is able to extend the hips better and thereby reduce the lordotic curve in the erect position.

The examiner must remember that a moderately prominent abdomen and an increased lordosis are considered normal in the growing child.[12] The flat abdomen does not appear until 14 to 16 years of age. There may be some winging of the scapulae, and this is usually acceptable during the preadolescent period. Phelps, Kiphuth and Goff[12] present a more detailed study of the relation of posture to age groups. An illustration using silhouettes of children of various ages is shown to demonstrate some examples of acceptable posture (Fig. 17).

The child will slump to bring the center of gravity to a more stable point when there is a deviation so that the joints, ligaments and musculature that support the skeletal system are in a situation of stress. In this slumped position the chest is flat, does not give adequate support to the viscera and interferes with adequate respiratory exchange. The child is in a position of visceroptosis, with malpositioning of the pelvis and legs. This posture is extremely fatiguing.

Abnormal anterior-posterior postural deviations as measured by a plumb line, photographed, or clinically diagnosed by inspection, usually fall into five descriptive classifications (Fig. 18): (*a*) relaxed faulty posture (*b*); kyphosis-lordosis posture, an accentuation of (*a*); (*c*) swayback posture (considered the same as lordosis or low lordosis). Swayback can be with or without an increased thoracic kyphosis. It is almost always associated with anterior pelvic tilt. (*d*) Flat back posture. There is an ironing out of the normal lumbar lordosis and sometimes the thoracic kyphosis with posterior tilt of the pelvis. (*e*) Round back posture. The lumbar and thoracic spine is convex with the head and shoulders forward in relation to hips and legs, often in association with hyperextension of the knees.

Lateral Deviations. In viewing the body from the front and from the back, any deviation from a median plane plumb line is considered faulty posture. The features to be noted upon inspection in erect posture are the leg length, the level of the hips, the alignment of the spine and legs, the shape of the thoracic cage, the level of the shoulders, and the contour of the trunk in relation to the dependent arms. If there is no flexion contracture of the hips, one can determine the leg length adequately by placing a finger on each iliac crest, sighting from the back. If any abnormality is noted at this examination, one can have the child bend over, placing the elbows on a chair in front of the body, with the feet approximately 3 inches apart and the toes facing forward and with the knees fully extended, but not hyperextended. By palpating the posterior-superior iliac spine in this position one can get a fairly good evaluation of whether one prominence is

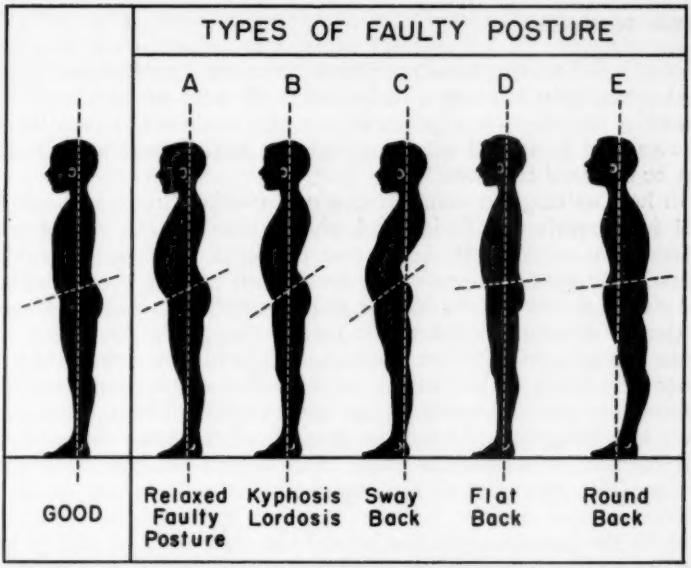

Fig. 18. Diagrammatic representation of the more common faulty anterior–posterior deviations compared to an example of good posture.

lower than the other or one leg shorter. This minimizes the possibility of measuring unequal iliac wings.[4] If there is a discrepancy in levels, this can be compensated by boards of various thicknesses ranging from ⅛ to 1 inch or more under the foot on the low side. If such a variation is noted, one should look at the spine and shoulders.

The best way to evaluate the spine is by putting marks at each spinous process with a marking pencil and measuring against a plumb line. This will demonstrate any type of compensatory curve which could be related to unilateral leg shortness. The spine can then be examined again after lifting the short side with the appropriate thickness of board. While the child is in the forward bending position one can sight along the horizontal plane of the spine and determine the amount and location of compensatory vertebral rotation, if any is present.

In a young child the shoulder level is usually found to be normal except when there are definite deformities. The evaluation of shoulder level should be done several times during the examination because a child under critical inspection is likely to hold his shoulders in a position other than that in which he usually carries them. If there is a persistent difference in shoulder level, one should look for unilateral scapular winging or other malpositions associated with scoliosis or paralysis. One rarely sees dropping of the shoulder on the dominant handedness side until the child is approaching the adult muscular development age. Unequal spaces between the trunk and the dependent arms usually indicate the presence of scoliosis.

Further Evaluations

If one is led to the conclusion that there are some specific muscle weaknesses, tight structures, or limitation of range of joint motion, a *screening examination* which will give the examiner information in all areas can be carried out. More detailed instructions for evaluation can be obtained elsewhere.[5, 7, 8]

In heel walking the examiner observes whether the child holds the feet in adequate dorsiflexion and whether there is any imbalance in inversion or eversion. It should also be noted whether the toes are extended to assist in dorsiflexion. During toe walking the strength in the plantar flexors and the balance at the ankle points should be noted. If there is a notable imbalance in muscle strength in the legs or feet, these two tests will disclose the fact. They will also demonstrate the range of motion of the ankles. Back-bending examinations will give information about strength, range and mobility. The squatting test gives one information about the strength of the knee extensors and hip extensors as well as the range of motion of the knee and hip in flexion. The remainder of the examination can be carried out in sequence.

With the examiner standing behind the *erect child* he should have the child abduct the arms to overhead position and then lower them to shoulder level, instructing the patient to give resistance as the examiner forces them downward. The shoulder girdles and back should be observed for muscular imbalance during this maneuver against resistance. With the elbows flexed one can test the shoulder adductors and depressors by lifting the weight of the child at the elbows combined with a lateral pull on them. While still standing behind the child, the examiner can test rotatory strength and range of the shoulders by reaching around the child and having him hold his hands on the abdomen while the operator pulls them away through external rotation. Likewise, with the child holding the hands away from the abdomen with elbows flexed, the operator can force them toward the abdomen against resistance.

With the *child prone* one can test the back extensors by holding the knees to the table and having him hyperextend the back. Pressure on the back of the head against maximum resistance while in this position will bring out any selective muscle weaknesses in the erector spinae group and neck extensors. With the child still in the prone position, the hands crossed at waist level in back and the elbows pulled toward one another, one can apply lateral pressure to the elbows and get some idea of muscle imbalances in the adductors and extensors of the shoulders and the muscle groups that hold the scapulae in retraction. In the prone position with the knee flexed the child should hyperextend the hip actively. He should be able to take resistance in maintaining this position—one extremity at a time. During this test the ability to stabilize the pelvis with the trunk muscles should be noted. In the same position, the knee flexed, hamstring strength can be tested by pulling the leg into extension against resistance.

In the *supine position* one should see whether the child can flatten the lower portion of the back on the table—a test for lower abdominal strength and lower back mobility. With the arms folded on the chest and legs stabilized have the child come to the sitting position—a test for upper abdominal and hip flexor strength. Watch for umbilical migration or trunk torsion during this act. In the sitting position with the knees extended, have the child reach for his toes—subjects with average trunk-leg length ratios should be able to touch the toes. Observe the back—it should be evenly rounded with no flattened or tightened areas. Further testing of hip strength in the supine position can be done by having the child resist abduction, flexion and adduction of the extended lower extremities. By flexing the thigh on the abdomen with subsequent rotation of the hip while in 90 degrees of flexion, one has completed the evaluation of range of hip joint motion. When the hip is flexed on the abdomen, the other thigh should remain extended if there is no hip flexor contracture. Hamstring tightness can be elicited by extending the knee while the hip is flexed and the pelvis is stabilized by pressure on the opposite knee. The relation of the pelvis and lower back to the table should be noted during this test to be sure that there is no compensation in these areas.

If specific muscle weaknesses are elicited, one should attempt to evaluate them in grades related to the expected normal. Records of the degree of muscle weakness, soft tissue tightness, and limitation of range are valuable gauges for future comparison while corrective procedures are being applied. Further neurologic examination should be carried out as indicated.

ETIOLOGY

Once the postural fault and the possible physical cause are determined, one needs to consider other etiologic factors. The history is extremely significant when attempting to determine the etiology of postural deviations. One should determine the presence or absence of previous illnesses, nutritional problems, postural and exercise habits, and factors producing static postural positions. The last would include such things as unilateral hearing loss and eye imbalance.

It has been the author's experience that the history in scoliosis is unreliable. The child may be brought to the pediatrician with a history of having "just noticed" that one shoulder was lower than the other or that the back "looked crooked." Usually the examiner finds a well developed curve which has probably been present for some time. The history in the anterior-posterior curves, however, is usually accurate. Deviations in this plane are usually noted at the very onset for esthetic reasons. The history of easy fatigability is common, but complaint of pain is rare. When persistent pain is associated with anterior-posterior curves in the early adolescent period, the condition should be investigated for vertebral epiphysitis. Once organic disease has been ruled out in the anterior-posterior abnormal deviations, the other physical factors must be explored. Consideration must also be given to emotional, psychological and personality factors.

One of the primary postural deviations that come to the physician's attention early in the child's development is so-called knock knees or bowlegs. In the early months of ambulation these "deformities" are sometimes magnified and need no special attention. They usually correct themselves as the medial longitudinal arch establishes itself and correct weight bearing is assumed. But if these deformities persist or progress, correction must be considered.

Most postural deviations are brought to the physician's attention between the ages of 4 and 14 years. Many of the anterior-posterior and the majority of the lateral spinal deviations become noticeable during this period because the child usually shows a spurt of growth from the eighth to the fourteenth or sixteenth year. Postural deformities in the younger age group are more prone to be related to improper clothing, lack of adequate exercise and other situations which produce static positions. Static postural positions seem to dominate as age advances. The girl who has started developing secondary sex characteristics with prominent breasts, and who has suddenly become aware of the opposite sex, may often assume a kyphotic, shoulder-protracted position in an effort to make the breasts less obvious. The tall, slender, self-conscious girl is apt to assume a stooped position. In the emotionally maladjusted child or the child with more profound psychological problems one may find the "position of fear."[8] This is a slumped posture with increased kyphosis, shoulder protraction, increased lordotic curve, winged scapulae, internally rotated femurs, and possibly valgus position of the feet. These constantly assumed positions are apt to have a permanent deforming mechanical influence upon the development of the child.

It is reported that 20 per cent of the lateral deviations or scolioses are of unknown etiology.[13] The remaining 80 per cent have various causes. There is a discrepancy in statistical figures, however, some authorities reporting as high as 80 to 90 per cent of scoliosis being of unknown etiology.[2, 6, 9] One group in which there are known etiologic factors can be classed as *congenital scolioses*. This includes malformations of the vertebra, thorax or scapula, and deforming intrauterine pressures. Another large group is classed as *acquired scolioses* and includes anatomic, physiologic or other asymmetries; pathologic affections of the vertebrae; pathologic affections of the bones and joints of the extremities; distorting conditions due to disease of the soft parts; and habit or occupational.[6]

In the lateral curvatures of the spine of unknown etiology there are many factors which aggravate the situation. Any condition of the soft parts or bones which produces an asymmetry of the trunk as a whole or any part thereof may initiate this condition. Lovett[10] states: "Anything which causes any part of the body to be held in an asymmetrical position will cause a lateral deviation of the spine . . ." Freiberg[3] states that the muscular changes are a result, not the cause, of scoliosis. Carey[1] states that "scoliosis is a spinal sign of the muscle-bone imbalance of the back and is not a specific disease entity." He supports the theory of malnutrition and inanition as the insidious cause of idiopathic structural scoliosis. Peckham[11] points out that this is a pathologic loss

of bone as well as soft tissue support wherein "the bones are very much softened and all the soft structures are very much relaxed." Once a lateral deviation of the spine has been established and the symmetrical equilibrium can no longer be regained, the scoliosis will progress until passive equilibrium is obtained. Steindler[14] states that this passive equilibrium is then maintained or altered according to the plasticity of the bone.

CORRECTION

The correction of faulty posture is an exceedingly difficult procedure in some cases, but in others is very successful. Corrective exercises are indicated in all abnormal anterior-posterior deviations and in the lateral curvatures of the spine with the exception of profound, almost fully developed scolioses with rotatory components. Many of the children will have suffered a background of parental tirades of "hold your shoulders back" and "stand up straight" and will have a poor parent-child relationship foundation upon which to institute a regimen of corrective exercises. A daily routine of these exercises is difficult to follow and is further complicated by lack of insight and motivation in the child. Likewise, the wearing of special supports is usually resisted by the child. Many times, in the emotionally disturbed child, a support or special garment will act as an additional crutch and serve to accentuate existing problems. All methods of postural training, corrective exercises and support should be kept as simple as possible.

Postural Training

Actual postural correction is aimed at strengthening muscle groups as well as providing kinesthetic training of the child to new postural positions, and thus to modify their body image or "postural awareness."[8] The child is made aware of new body part positions by placing his body in a corrected position. This makes him more conscious of his previously "normal" poor postural position. For simplicity, correct postural positioning is done in five body part corrections in the erect position and four in the sitting. One attempts to put these corrective procedures into short commands which the child can learn and practice.

1. Erect Position. *"Toes Pointing Straight Ahead."* In this position the feet should be approximately 1 to 2 inches apart and slightly abducted. This should produce weight bearing on the outer borders of the feet.

"Roll the Hips under and Tighten Them." If the examiner demonstrates by manipulating the patient and presses the buttocks together, the child soon interprets this command to mean a tightening of the gluteus maximus. Strong gluteal contraction will incline the pelvic outlet posteriorly, lifting the anterior brim of the pelvis, placing tension on the iliopsoas complex and outwardly rotating the femurs.

"Pull Your Stomach up and In." This command will usually cause

the patient to tighten the abdominal muscles, further decreasing the lumbar lordotic curve by maintaining the posterior pelvic tilt.

"Lift Your Chest Up." In this maneuver the shoulders are to remain completely relaxed and the chest is to be brought up to a midinspiratory-expiratory position. The child can then be instructed in combined thoracic and abdominal breathing. This exercise should produce normal positioning of the shoulders and decrease kyphosis.

"Stand and Walk as Tall as Possible, Forcing the Back of Your Head toward the Ceiling." If this position is correctly assumed, there will be a decrease in cervical lordosis and a further decrease in kyphosis.

2. SITTING POSITION. *"Sit with the Feet Flat on the Floor."*

"Pull the Stomach up and In."

"Lift the Chest Up."

"Sit as Tall as Possible, Forcing the Back of the Head toward the Ceiling."

These positions for correction of the posture should be considered static and are to be maintained with strong muscular contractions for one minute several times daily. They can be modified into any terminology to suit the needs. Better cooperation is obtained from the younger child if the whole program is presented as a game.

Anterior-Posterior Postural Deviations

In addition to the foregoing postural training, the treatment plan in correction of anterior-posterior curves seeks to stretch tightened structures and strengthen weak muscle groups. Also, certain muscle groups, such as the upper back extensors, are strengthened to make them stronger than is normally needed in correct posture. One cannot possibly outline specific exercises in detail to answer all needs. As a result, references are made to other sources of information which outline specific exercise techniques.[7, 8]

In general the thoracic spine should be stretched and strengthened in extension. Except in flat back and round back deformities, the low back should be stretched and strengthened in flexion, and this will naturally include the abdominal muscles. Any tightness elicited in the hips and thighs should be stretched. It may be necessary to institute special procedures such as the application of shoe corrections or the use of other measures to attain correct weight bearing on the feet. In the presence of bowlegs or knock knees modification of weight bearing is sometimes indicated if it seems that these conditions will not go on to correct themselves.[4] The shoulder abduction support will rarely be indicated in the anterior-posterior curve. When it is used, it should serve only as a reminder to the patient and help keep his chest elevated. It is not meant to pull the shoulders back.

Lateral Curvatures of the Spine

The therapeutic approach to correction of lateral curvatures of the spine is a much more profound problem. Scoliosis associated with a

congenital anomaly or a paralysis must be treated by special exercise techniques, immobilization or surgery. The treatment of known causes should be obvious, but one needs to remember that muscles and other soft tissues must be able to support corrected positions of the spine. The treatment of scoliosis has vacillated between immobilization and mobilization for many years. Too rigid immobilization of children with progressive scolioses which are considered idiopathic has been carried out many times at the expense of the patient's emotional, psychological and intellectual development. On the other hand, the lack of supports, immobilization or surgical correction has caused other children to grow into adulthood with serious deformity.

Corrective exercises directed toward stretching the tightened structures on the concave side of the curvature and strengthening the musculature on the convex side along with derotation exercises certainly have a place in the treatment of idiopathic scoliosis. These exercises should be applied by highly skilled physical therapists under close medical supervision. The less profound the curve, the better are the results obtained by this procedure. These corrective exercises coupled with supports to prevent reassumption of the curve and accentuation of postural positions are indicated. The previously described postural training should also be utilized. Detailed directions for scoliosis exercises can be found elsewhere.[4, 8] Leg length discrepancies should be corrected, preferably in a gradual manner. Initial full correction will sometimes produce strain in the low back or sacroiliac area.

A great number of structural scolioses will progress and come to eventual surgical correction in spite of an intense and prolonged exercise program, the use of supports and possibly even complete bed rest. It is typical of these scolioses to progress rapidly during the periods when growth is rapid, and in many cases the only corrective exercise goal is the attempt to prevent further deformity and retain strength in certain muscle groups to support the back after operation. Since operation is usually delayed until the time the epiphyses begin to fuse in the vertebrae, it is important to keep the spine mobile and the muscles in good tone.

An over-all approach to faulty posture should be attended by counseling with the parents and, when indicated, psychiatric consultation. Correction of eye defects and hearing defects should receive special attention. The restrictions of clothing or inadequate furniture should be considered. Stimulation of the child to become normally active and to participate in swimming and other sports which produce general exercising effects should be encouraged for both physical and psychological reasons. When postural deviations require that careful exercise techniques be worked out, the child should be referred to an area where trained therapists can carry out the physician's orders and where the child can have professional observation during active treatment and in the home exercise program. The child's progress should be checked regularly, keeping accurate measurement records and modifying the program as indicated over a prolonged period of time.

SUMMARY

A considerable number of children examined by a physician will be found to have faulty posture when measured and evaluated by rigid criteria. There are, however, many minor deviations that are acceptable at various ages. The serious deviations in both anterior-posterior and lateral spinal curvatures require active treatment applied early to obviate serious deformity in adulthood and enhance the child's physical and psychological health.

Each physician should have proficiency in recognizing and treating faulty posture. Those cases that present problems beyond the physician's ability to diagnose and treat should be referred to others of known specialized skills. Methods of approaching some of the more common problems have been presented.

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COMMON FOOT PROBLEMS IN CHILDREN

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The foot problem is one of the most frequent conditions which the physician sees in children. It is the purpose of this paper to consider only those foot problems which are likely to be seen daily in the offices of those physicians with a particular interest in children. If we discuss flat feet, pigeon toes and related positional deformities, we will have quantitatively considered the majority of these problems.

FLAT FEET

Definition

It would be appropriate at this point to define clearly a flat foot in order that we may have a common ground for understanding what follows. A flat foot may be considered a triad of abnormalities: there is loss of the medial longitudinal arch of the foot; pronation of the hind foot; and external rotation (abduction) of the foot. It may be desirable, for purposes of discussion, to divide the foot into three anatomic parts: the hindfoot, which consists of the talus and os calcis; the midfoot, which is made up of the tarsal bones; and the forefoot, which has the metatarsals and the phalanges (Fig. 19). This is more than an arbitrary division, for the deformities under consideration will be related to these various segments of the foot. For example, pronation will occur primarily in the talocalcaneal joint and to a less degree in the tarsal area. External rotation will occur partially at the junction of the forefoot and the midfoot, and also between the midfoot and the hindfoot. Most of the external rotation is more apparent than real, however, and actually occurs in the hip joint or in the tibia if external torsion is present.

Loss of the medial longitudinal arch will occur in one of two places. The first and more common is between the talus and the navicular, and the second between the navicular and the first cuneiform. Thus,

if standing x-ray films of a flat foot are made in the side projection, one will note the break in the medial longitudinal arch at one of these two joints (Fig. 20, *B*, *C*) Anatomically, the medial longitudinal arch of the foot is made up of the calcaneus, the talus, the navicular, the first cuneiform and first metatarsal bone. The remaining cuneiforms, and the second, third and fourth metatarsal bones, also participate in the formation of the medial longitudinal arch, but in diminishing degree lateralwards. When the foot is viewed from the medial site, the bones form a bridge with the navicular representing the keystone of an arch (Fig. 20, *A*).

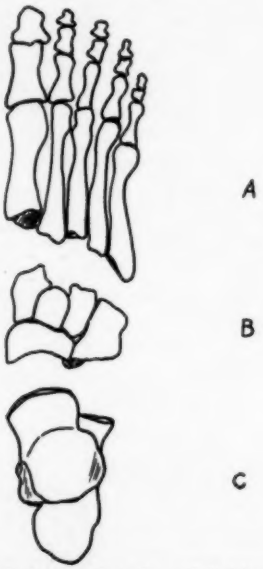

Fig. 19. Osteology of the foot, showing the subdivisions into (*A*) forefoot, (*B*) midfoot and (*C*) hindfoot.

The bones of the medial longitudinal arch are held together by ligaments, capsules and pericapsular connective tissues which are important static supports. In addition, there is dynamic support of the arch provided by the muscles. The anterior and posterior tibial muscles are the more important of these, but the peroneus longus and the short flexor muscles of the foot also exert positive arch support.

When the static and dynamic supports are normal, the child will be noted to have a well coordinated gait. He will initiate walking by bringing the foot forward and starting weight bearing on the posterior portion of the heel. As his body moves forward the weight will now be borne on the lateral aspect of the heel. When the body is forward of center, weight bearing will have been transferred to the lateral aspect of the foot to the fifth metatarsal head and toe, then across the

metatarsal heads and toes to the first metatarsal phalangeal joint, ending with push-off on the big toe. If you examine a pair of worn shoes of a normal child, you will note that the heel will be primarily worn in the outer posterior quadrant.

The typical flat-footed child will be observed to have a rather awkward, somewhat stiff-legged gait. He initiates walking by landing on the posterior medial aspect of the heel, transfers the weight across the medial side of the foot to the metatarsal area and pushes off with the

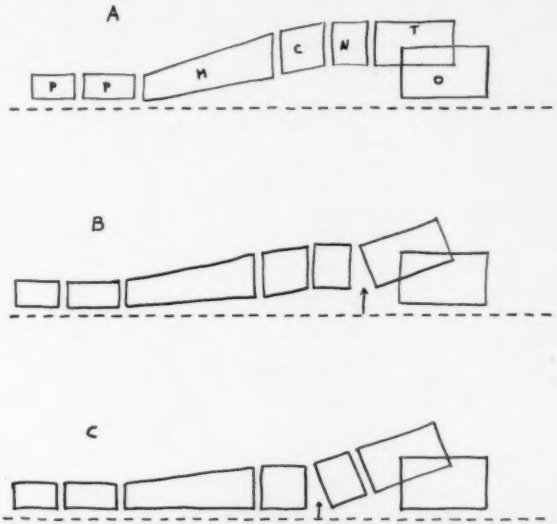

Fig. 20. Schematics of side projection of foot, showing (*A*) the normal arch. *P*, The phalanges of the big toe; *M*, the first metatarsal; *C*, the first cuneiform; *N*, the navicular "keystone of the bridge"; *T*, the talus; and *O*, the os calcis. *B*, Shows a flat foot with the break in the arch between the talus and the navicular. *C*, Shows the break between the navicular and the first cuneiform.

first metatarsal phalangeal joint and big toe. There is very little spring to this gait, and if you examine the worn shoes of such a child, you will see that the heel is worn on the medial side rather than the more proper lateral posterior quadrant.

Etiology

Flat-footedness is probably an inherited characteristic of relaxed ligaments. A familial history of this deformity can frequently be obtained. Such information should be sought. I would be more concerned about the care of a flat-footed child with a family history of painful flat feet than one who does not have such a history.

There are a number of conditions which may cause or contribute to the formation of a flat foot. Calcaneovalgus deformity of the feet is commonly noted at birth. This deformity is probably one of prolonged

position in utero with the feet held in a position of dorsiflexion and valgus (Fig. 21). The dorsum of the foot is almost in contact with the anterolateral aspect of the tibia. Some believe that the calcaneovalgus foot is a congenital deformity, but I am not sure that it is.

I recently saw a newborn with bilateral calcaneovalgus deformities so severe that I felt that corrective plaster casting of the feet should be done. At the time that I saw the patient it was not convenient for the castings to be started at the hospital, and treatment was deferred until the mother could bring the infant to the office. The patient was seen 4 weeks later, and on examination the calcaneovalgus deformities were completely gone. In their place, however, was a fairly severe bilateral metatarsus adductus. This patient's older brother had had a similar congenital metatarsus adductus which I had treated several years before with corrective casting. This patient obviously had a congenital metatarsus adductus as did his brother before him. He

Fig. 21. Newborn infant showing a moderately severe calcaneovalgus deformity of the feet. (From C. F. Ferciot: *Clinical Orthopedics*, No. 1. Philadelphia, J. B. Lippincott Company.)

required a series of 4 sets of casts to correct his pigeon toes (metatarsus adductus). I believe that at least in this case the patient had a positional deformity in utero (calcaneovalgus) masking an underlying true congenital deformity. This should support the idea that calcaneovalgus deformities can be positional at times, if not always.

If a fairly severe calcaneovalgus deformity is not treated during the period of nonweight bearing, the foot may remain in a position of pronation and external rotation. This, I believe, is responsible for some of the flat feet we see in children. Thomson[11] and Ferciot[1] have independently shown that the relation between calcaneovalgus deformities and flat feet is more than coincidental. Roughly 15 per cent of all newborns show some degree of calcaneovalgus.[1] One third are mild, one third are moderate, and one third are severe. The mild deformities will correct spontaneously and the moderate ones probably require only stretching and good shoe support when the child starts to walk. The severe deformities will need casts or plaster splints for correction. This should be started under three months of age. If the

child is already walking, the treatment will not differ from that of the flat foot.

Faulty sleeping and sitting habits are other factors which contribute to positional deformities. Most infants sleep on their abdomen (Fig. 22). If they remain constantly in this position with their feet and legs turned out, an external rotation deformity may result. If the knees are in extension, the rotation will be at the hip joint. If the child is a knee-chest sleeper, an external tibial torsion deformity may result. These rotational deformities may or may not be associated with the calcaneovalgus problem mentioned before. They will correct spontaneously when the infant is able to turn by himself and get into other sleeping positions. But if the patient persists in a single abdominal sleeping posture, the deformities may remain. When such a

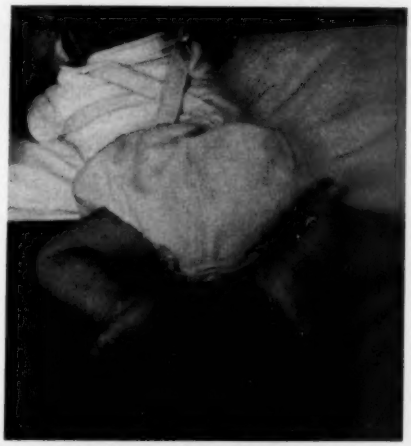

Fig. 22. The abdominal sleeping position with the legs held in external rotation.

child is old enough to walk, he will keep his feet in external rotation and pronation. This type of gait-stance will tend to flatten the medial longitudinal arch of the foot and throw the knees into valgus (knock knee).

The young child who sits on his legs constantly with his feet turned out will tend to perpetuate the external rotation-pronation position which leads to the flat foot deformity. Early standing and walking in the obese infant may be a contributory cause. Most children when learning to stand and walk will assume a wide leg stance with both feet in external rotation for balance. This position alone will throw the weight to the medial aspect of the foot with resultant pronation and variable degrees of flattening of the medial longitudinal arch. In the obese infant this may lead to flat foot.

Occasionally one will see a patient with a tight heel cord which has come about from either position, congenital anomalies or disease. This patient will find that the only way he can get his heel down

when walking is to turn it into decided valgus, the pronated position of the flat foot.

Not uncommonly one will see loss of static foot support in the child who is debilitated from chronic illness. With this relaxation or laxity of the ligaments the foot will go into pronation and the arch will drop. This differs in no way from the congenital flat foot except that the laxity is acquired after birth. We often see an associated deformity of the knees in flat-footed children, i.e. the knock-knee deformity. If one observes the knock-kneed child standing and walking, he will note that there is only one position for the foot and ankle to take, and that is pronation. With the exception of the child who has hereditary knock knees, it is hard to decide whether the valgus of the knees is caused by a pronated flat foot or contributes to the flat foot. Usually the treatment of either deformity will help the other.

Certain diseases are known to cause a flat foot. For example, poliomyelitis may result in paralysis of only the anterior tibial muscle in one leg. The loss of function of this muscle alone is enough to create a paralytic flat foot on the affected side. In the patient with cerebral palsy who has spasticity a flat foot may develop because of overaction of muscles. A spastic child with disease limited to his lower extremities may have prime involvement of the peroneal muscles alone. The spasticity of these muscles will evert (pronate) the foot to a greater degree than the more normal muscles on the medial side of the foot (posterior) and anterior tibials are able to oppose. The foot will be forced into pronation and external rotation, and a spastic type of flat foot will result.

The so-called peroneal spastic flat foot has nothing to do with cerebral palsy and may result from other causes. The spasticity in this type of condition probably is some sort of protective mechanism for splinting a painful foot. Painful feet may in turn be caused by congenital anomalies, injuries, disease or acquired malformations in the tarsal area. There may be coalition of bones in the tarsal area or the presence of unusual secondary ossicles which cause pain with movement of the foot. Outland and Murphy[7, 8] and Hark[3] have reported on many instances of tarsal coalitions. These may occur between the talus and the os calcis, the os calcis and the navicular, and so on. These coalitions may be congenital in origin or acquired through injury, disease, rheumatoid arthritis, and so forth. Frequently nothing is seen on x-ray examination of the foot other than a small bony ossicle, but with time and repeat x-ray studies eventual coalition between two of the tarsal bones may be demonstrated.

The question is: Why should you have pain originating from a joint (subtalar, for example) when coalition of the two bones has taken place and motion is no longer present? This is difficult to explain other than on some reflex pain mechanism. Outland and Murphy believe that the pain may originate primarily from the talonavicular joint, although this area is probably not supplied by the superficial peroneal nerve. These tarsal abnormalities can also result in a rigid foot which may be the forerunner of a painful, spastic flat foot. Rigid flat feet are not always painful, however.

Examination

Children's feet should be observed from many positions. They should be examined with the patient lying down, sitting, standing, walking and, if your office permits, running. Look for splaying as the patient shifts his weight from foot to foot. This may be missed by any other method. Splaying indicates increased laxity of ligaments. With weight bearing the foot spreads out. This is particularly noticeable in the forefoot area.

With the child in supine position you can check all the joints of the lower extremities for mobility and deformities. Children who have extreme relaxation of ligaments will show a hypermobility of all joints. Decreased mobility as seen in the rigid foot will also be detected by passive examination of joints. The hip joints should be tested for internal and external rotation to see whether there is any limitation of movement due to positional deformities. This is also a good time to observe the patient's preferred, prone and supine positions. Check for a tight heel cord by dorsiflexing the foot with the knee in complete extension. Normally you should be able to flex the ankle to 75 degrees or less. If this maneuver is done with the knee flexed, the tight heel cord may be missed. If the tightness involves the gastrocnemius muscle and not the soleus, the foot will dorsiflex well with the knee bent. Since the gastrocnemius muscle originates above the knee joint, flexion of the knee will relax it, and the foot dorsiflexes with ease. If the soleus is tight, dorsiflexion will be limited regardless of the position of the knee. This is because the soleus originates below the knee joint.

With the patient in the sitting position the knees are brought together and flexed to 90 degrees. Ordinarily this will cause the feet to hang in 10 or 15 degrees of external rotation. If tibial torsion, either external or internal, is present, one can see the deviation from normal (Fig. 23).

With the patient standing and the knees in extension the loss of the medial longitudinal arch can easily be seen (Fig. 24). The degree of pronation of the hindfoot will also be detected. Pronation can be seen more readily from behind. If you will look at the heel cords, you will see that they are not straight. They curve outward (Fig. 25).

The feet of the very young child may appear flat because of the absence of a well formed footprint. But upon closer inspection you will see that the child has a rather large fat pad on the medial plantar aspect of the foot. When this alone is present, there will be no appreciable pronation of the hindfoot, and the degree of external rotation of the foot will be only slightly increased. This hypertrophied fat pad may act as a sort of internal arch support. In time it will atrophy. This will leave the patient with an arch which has a normal appearance.

With the patient standing and the knees barely touching, the distance between the medial malleoli can be measured and recorded. This figure will indicate the degree of knock knee present. It will be of value in determining whether or not improvement is occurring with treatment.

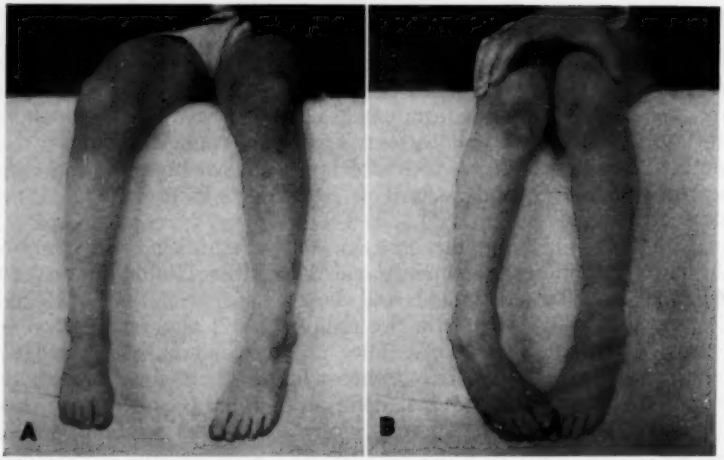

Fig. 23. *A*, Relaxed sitting position with apparent mild toeing-in. *B*, Same patient with knees touching. Now the internal tibial torsion is evident.

With the patient walking an analysis can be made of his gait, degree of pronation and external rotation. Muscle strength can be grossly evaluated with a few simple maneuvers. If the child can walk on tiptoe, you know that the calf muscles are adequate. If the patient can heel walk, you know that the long extensors of the toes and the anterior tibial are functioning satisfactorily. With the patient sitting the strength of the posterior tibial can be tested by having him turn his foot in as you resist him with your hands. If you grasp the heel with one hand and resist the foot with the other hand, you can measure the strength of adduction and also feel the taut posterior tibial tendon as it passes posterior to the medial malleolus. A similar maneuver on the lateral aspect of the foot will test the strength of the peroneus longus and brevis muscles.

The feet should always be examined in different projections by x-ray if you feel that there is a possibility of bone or joint malformation. This should always be done if the patient complains of painful feet or legs.

Treatment

Treatment of the flat foot is individualized in accordance with the needs of the patient and the experience of the examiner. There certainly is no unanimity of opinion as to how a flat-footed patient should be treated. Basically, one must decide whether the deformity is severe enough to require any special care. I believe that most of the mildly flat-footed children could be left alone and would come to no grief. Yet I would treat even a mildly flat-footed child with corrective shoes if there is any family history for painful flat feet. I am sure that some children with very mild flat feet are treated simply because of parental pressure.

After one has decided that the patient's problem warrants treatment, what have we to offer? We should attempt to overcome such existing deformities as have been mentioned before and strengthen any weakened muscles which are present. With the ordinary pronated flat foot we should first do something to elevate the medial longitudinal arch.

Fig. 24. Young child with moderately severe pronated flat feet.

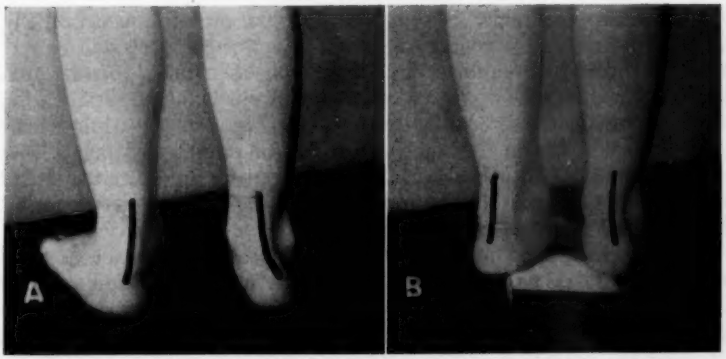

Fig. 25. A, Pronation of the hindfoot as seen from the rear. The deformity is more severe on the right than on the left. B, Same patient, showing moderate correction of the pronation with elevation of the inner borders of both heels.

This can be accomplished with the use of an arch support. These are available in many different forms. The most common is that of a rubber support which is covered in leather and can be inserted directly into the shoe. They work well and are available in all sizes and a range of styles, obtainable from brace shops. They have some disadvantage, however. They are rather bulky and will require a wider shoe to handle them. Often when the shoe is large enough to accommodate the foot and the arch support, there may be too much width in the heel and across the forefoot area. Insert arch supports also tend to raise the heel out of the shoe. Most oxfords have a rather low heel counter which will not hold the patient's heel well, so that he is continually walking out of his shoes. It may be necessary to use high-top shoes with the arch supports in order to overcome this. Arch supports can also be made from leather, plastic and stainless steel. These are more rigid than the rubber type, but are generally not advisable for children.

For the milder flat-footed child the medial longitudinal arch may be supported by using a Thomas heel with an additional wedge to the inner border of the heels. This will, to some extent, make an arch support out of the sole of the shoe (Fig. 26). Instead of using the Thomas heel to elevate the medial longitudinal arch, one may add $\frac{1}{8}$ to $\frac{3}{16}$ inch to the inner border of the heels of regular leather shoes.

Corrective shoes are a simple solution to these problems. Many of the children's shoe manufacturers* market a so-called orthopedic shoe. This type of shoe will be made entirely of leather. It will have a Thomas heel and $\frac{1}{16}$- to $\frac{1}{8}$-inch elevation to the inner border of the heels. There will be a long hard counter on the medial side of the shoe which acts as a built-in arch support. This can be satisfactory treatment of the flat-footed child if a few points are observed. It is best not to use a very rigid type of shoe for young children. Some of these shoes are made with steel shanks which permit little flexibility in the tarsal area. Some do not have proper placement of the built-in arch supports. The support is best if it lies under the calcaneonavicular joint rather than the more distal tarsal area.

After having elevated the medial longitudinal arch the next problem is that of pronation. Wedging the inner border of the heels will correct this. The heels will require as much wedging as it takes to straighten the heel cords as they appear when viewed from behind (Figs. 25; 26, *E*). In general, it will require from $\frac{1}{8}$- to $\frac{3}{16}$-inch elevation to the inner border of the heels, but the real test of proper wedging will be in the wearing. If the child wears the heel out in the posterior lateral quadrant of the heel, then you know that the wedging is proper. If the heel wears out posteriorly or medially, more wedge is needed.

The last remaining problem with the flat foot is that of external rotation (abduction). Fortunately, when the medial longitudinal arch is elevated and the pronation corrected, much of the external rotation is overcome and little else is necessary. If toeing-in persists even with

* Many good corrective shoes are available in most cities. I usually use the Arch Corrector shoe, made by the Walk-In Shoe Co. of Schuylkill Haven, Pa. It is not extremely rigid, and the range of sizes is excellent.

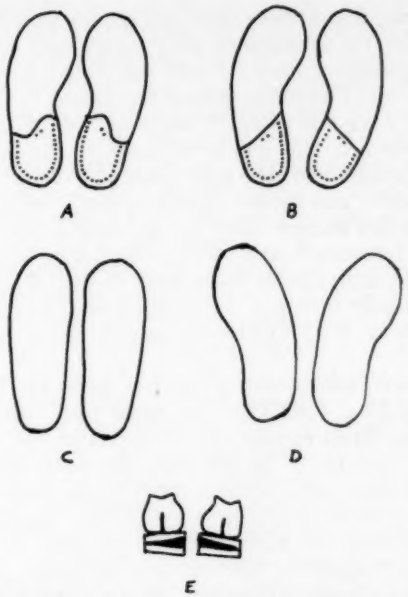

Fig. 26. Drawings showing the lasts and corrections commonly used to treat foot problems. *A*, Bottom view of a good corrective shoe for a flat foot with a mild in-flare to the soles and Thomas heels. *B*, The sole of an in-flare shoe with toeing-in and a modified Thomas heel. This shoe is used for the severe flat foot. *C*, Straight-line last occasionally used for a mild pigeon-toe. *D*, The outflare shoe last which is used for the more severe pigeon-toes. *E*, Back view of corrected shoes showing elevating wedges of the inner aspect of the heels.

corrective shoes and additional inner heel wedges, a wedge can be placed on the inner border of both soles. This elevation should be limited to ⅛ inch. If this fails to overcome the external rotation, then it may be necessary to try a truly corrective orthopedic shoe, which will be described a little later.

Proper fitting of shoes is important and should be checked with the patient standing. When the shoes are laced comfortably, the eyelets should form two parallel rows. If the top eyelets are farther apart than the lower ones, the shoe is too narrow at the instep. If the top eyelets are closer together than the lower ones, the shoe is probably too wide. As far as length is concerned, the end of the longest toe, usually the big toe, should be approximately ½ inch from the end of the shoe. There is no need to fit shoes long enough to provide for extreme growth, since most active children will wear out a pair of shoes in three to four months. The width of the shoe across the metatarsal area should also be checked. Again with the child standing one should be able to pinch a few millimeters of leather between the thumb and the index finger. If you cannot do this, then the shoe is too narrow, and if you can grasp a centimeter or more of leather, the shoe is too wide.

One other point about shoes that you should understand is the cost. There is considerable variation in price which may seem unreasonable to you. The quality of material and workmanship would appear to have its limitation. The prime reason for difference in cost, however, is the range of sizes and style. A manufacturer who makes shoes in limited style selection and widths of narrow, medium and wide can sell his shoes cheaper than the better shoe manufacturer who provides shoes in many styles and widths. If your patient needs an 8 EEE width, for example, in the cheaper shoe he will take a 9 wide. Wide is the equivalent size between E and EE; medium is equal to something between C and D; and narrow is between A and B. Every half-size of length automatically increases the width one size. Thus an 8 EEE is the same width as 9 E. Obviously, proper fitting is easier with the better shoes.

So far we have mentioned corrective shoes for the patient with moderate to mild flat feet. There are some truly corrective orthopedic shoes that are available for the severely pronated flat feet. These shoes are more rigid, but may be helpful when the lesser corrective measures fail. Few of the shoe manufacturers produce this type of foot gear. The one that I have used primarily is called the Tarso-Supinator.* The principle of this shoe is a toed-in last; i.e. the last of the shoe turns in rather markedly, forcing the forefoot into adduction. In addition, there is a built-in hard counter to support the arch and a modified Thomas heel with inner heel wedging. These are fairly expensive shoes even when compared with the better grade of arch-supported shoes, but they are worth it when indicated (Fig. 26, *B*).

Exercises are beneficial in treating the flat-footed child with ligamentous laxity. When the patient is old enough to understand, exercises can be shown. Try to teach him to walk on the outer borders of his feet, pick-up-marble exercises, toe walking, and so on.[13] The purpose of the most important single exercise is to develop the posterior and anterior tibial muscles. It is best performed in the sitting position. Dorsiflex the feet while holding them in strong adduction and supination. This will place the anterior tibial and posterior tibial under the greatest amount of tension and help to elevate the medial longitudinal arch. These exercises should be performed at regular times during the day and should take 5 to 10 minutes.

It is probably advisable at this point to discuss prognosis as regards the appearance of the flat foot under treatment. I doubt whether much cosmetic improvement will be noted despite the use of arch supports, corrective shoes and exercises. Over a period of years some improvement in appearance of the foot may occur, but it may not be dramatic. If the parents are expecting treatment to bring about a normal-appearing high arch, they will be disappointed. It is best to prepare them in advance. The purpose of treating a flat foot is not for cosmetic effect, but only to see that the patient does not unnecessarily develop a painful flat foot as an adolescent or adult. If the arches of a flat-footed

* The Tarso-Supinator is manufactured by the Maurice J. Markell Shoe Company of Yonkers, New York.

child are supported properly during the growth period, the bones will develop normally and a serviceable, painless foot will result. Children with severe flat feet probably will require arch support as adults.

The general prognosis for the child with flat feet is good. There are many middle-aged and elderly persons with severe flat feet who have never had any treatment and are yet to exhibit their first symptom. Unfortunately a large segment of our adult flat-footed population does not fare this well. It is at times difficult to decide which ones need care and which do not. Until our understanding of this problem improves we will have to treat the bulk of them.

So far we have considered only conservative care of the flat-footed patient. There will be times when conservative treatment must be abandoned and surgical intervention undertaken. When the problem is one of muscle imbalance as is seen in poliomyelitis with the loss of the anterior tibial tendon, some soft tissue procedures can be done. In most instances the better surgical procedures for flat feet evolve around stabilization of the joints of the hindfoot and midfoot. If the subtalar joint is stabilized, this of course will correct pronation and not permit the talus to tip forward and medially as it ordinarily does when the arch is flat. If in addition the talonavicular and calcaneocuboid joints are fused, a classic triple arthrodesis is accomplished which will provide complete stabilization to this area. This is a most satisfactory procedure. However, triple arthrodesis should not be undertaken much before the patient is 11 or 12 years of age. If it is necessary to provide stabilization in the younger child, an extra-articular fusion of the subtalar joint alone using a bone graft can be done.[2]

To my mind the most important indication for bony stabilization of a flat foot is pain. There may, however, be times when a young child with severely deformed flat feet, in whom you anticipate pain and disability, should have early stabilization. This would be particularly advisable if the foot is uncontrolled with corrective shoes or arch supports.

Children with flat feet infrequently complain of pain. Pain is far more common in adolescence and adult life. Occasionally we will see a child with severe flat feet who has pain referable to the arch area or will complain of foot soreness, fatigue, discomfort in the calf areas of his legs, or even some cramping of his leg muscles at night after going to bed. When I get complaints of pain with the mildly to moderately flat-footed child, I will look elsewhere for the cause of his discomfort. Sitting on the legs all the time in what Lewin calls the "vicious sitting" position is a more likely cause for these vague leg and foot complaints than is flat feet (Fig. 27).

METATARSUS ADDUCTUS

Metatarsus adductus is the proper name for the foot deformity more commonly known as pigeon toes. Sometimes this deformity is referred to as a metatarsus varus. There has been much confusion about this

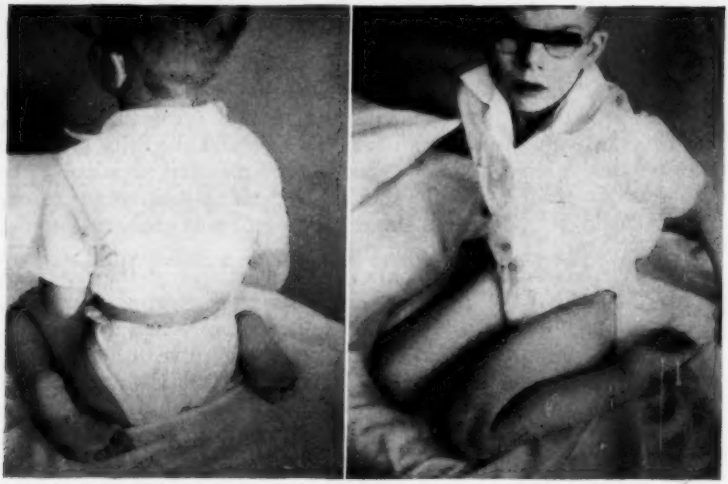

Fig. 27. The "vicious sitting position" (Lewin), a common sitting habit of children which is thought to be responsible for much of the complaints of leg pains and aches.

terminology in the literature for years. Actually a metatarsus varus is the same as a metatarsus adductus except that there is a strong tendency for the foot to supinate (the opposite of pronation) as well as toe in. For our purposes, metatarsus adductus is the choice expression. The presence of a true varus of the foot with forefoot adduction is rare and can be ignored here. In metatarsus adductus the deformity is between the forefoot and the midfoot (Fig. 19).

The pigeon-toe deformity is extremely common and, I think, among the most interesting to handle. The etiology may vary and the treatment changes with age.

Etiology

Pigeon-toe deformities can be divided into three categories on the basis of etiology. The first is the congenital metatarsus adductus, which has a definite hereditary background such as the case previously described. The deformity is immediately noted at birth and is usually fairly severe. Examination reveals limited mobility of the foot when passive stretching of the toeing-in deformity is attempted. In the congenital type you may find that the big toe is not as long as the second toe. This will not be easily recognized at first, but when the foot has been corrected, the shortening is more apparent. X-ray films will reveal the shortening to be in the first metatarsal bone. In a recent clinical study of persistent pigeon-toe deformities Thomsom[12] showed that abnormal insertion of the abductor hallucis can be responsible for the persistence of a metatarsus adductus, or at least the big toe will

continue to toe-in even though the other toes and all the metatarsals have been restored to their normal anatomic position.

Metatarsus adductus may also be caused from a position in utero. This deformity can also be noted at birth, but it is not as severe as the congenital type, the foot is more flexible to passive manipulation, and there will be no shortening of the first toe. Treatment is a lesser problem than that encountered with the congenital type.

The third and, I think, most interesting cause of metatarsus adductus is acquired after birth. This too is a positional deformity, but it occurs as a result of the infant's sleeping position. It may first be noted at two or three months of age and can be a source of some embarrassment to the unsuspecting physician when the mother calls the deformity to his attention in the office. He may think that the child had the deformity at birth, but that his examination was not careful enough to find it. Actually it is a deformity which occurred after birth.

It is most common for an infant to be kept on his abdomen after birth. This is a safe position should the infant regurgitate any of his feedings. Also infants seem to sleep better this way. Many of them will assume the position in utero with their knees tucked under them and their feet turned in. The child who continuously remains in this knee-chest sleeping position (Fig. 28) for a few months will acquire a pigeon-toe deformity. He may have not only a metatarsus adductus, but also varying degrees of internal tibial torsion. If the infant gives up the knee-chest sleeping position, but sleeps on his abdomen with his feet turned in, only the metatarsus adductus deformity will be present.

As was mentioned previously, if the patient turns his feet out in the abdominal sleeping position, he will acquire an external rotation deformity which may lead to a flat foot deformity later on. It should

Fig. 28. The knee-chest sleeping position. If it persists long enough, metatarsus adductus (pigeon-toes) and tibial torsion will occur.

be noted that if, after a short time, the child starts to sleep in different positions such as on his side and on his back, these positional deformities will usually correct themselves. I am certain that many children with a metatarsus adductus and internal tibial torsion resulting from the knee-chest sleeping position have corrected spontaneously several months after abandoning this fixed sleeping habit. The problem of treatment concerns only those children who persist in the abdominal or knee-chest sleeping position for prolonged periods of time.

Examination

Examination of the infant with a metatarsus adductus should start with the patient in the supine position. Observe the degree of toeing-in which is present and passively manipulate the foot to determine how tight the structures are. Note the presence or absence of shortening of the big toe. See if there is any varus of the foot, and be sure that you can dorsiflex the foot at the ankle past 90 degrees. If a congenital clubfoot is present, it will not be possible to dorsiflex the foot out of equinus.

Flex the hips and knees to 90 degrees and bring the legs together. In this position you can determine the degree of internal tibial torsion (Fig. 23). With the knee flexed a knowledge of the general positioning of the medial and lateral malleoli of the ankle will be helpful. In the ordinary foot with the knee flexed the medial malleolus will be anterior in relation to the position of the lateral malleolus. When internal tibial torsion is present, the lateral malleolus will be more anterior than normal as compared with the medial malleolus. Using this as a guide, one can estimate the degree of torsion of the tibia. I have frequently seen infants with as much as 40 or 50 degrees of internal tibial torsion (twisting) resulting from the knee-chest sleeping position. If the patient is now placed in the prone position, his usual abdominal position will be seen.

In the ambulatory child the examination will be similar except that the legs and feet should also be examined standing and walking. A child with internal tibial torsion and a metatarsus adductus may appear extremely bowlegged. But if he is examined in the sitting position with the knees flexed, you will note that the bowing is not nearly as great as it appeared when the child walked. There may be some associated bowing of the legs, but this is usually confined to the tibiae. You may see a child who appears extremely pigeon-toed when walking, but on careful examination of the legs you will note that he has little metatarsus adductus, but has severe internal tibial torsion. The torsion will make the walking child appear pigeon-toed. I do not believe that there is any explanation for tibial torsion, either internal or external, on any basis other than a positional one. The only rare exception that I know of is the child who has an external rotational deformity of the tibia as the result of a contracture of the tensor fasciae latae originating from poliomyelitis.

Treatment

Treatment must necessarily be divided on a basis of age. If the deformity is present at birth, treatment will then depend upon the severity. If it is mild, an attempt can be made to allow the deformity to correct itself by influencing the infant to sleep on his side with a blanket roll under his back for support[5] (Fig. 29). If the patient will accept this position, the deformity will probably correct itself without further treatment. If, despite the change in position, the deformity persists, this child should be placed in outflare shoes with an attached abduction bar (Fig. 30) for sleeping. The shoes will keep the feet in the overcorrected position of abduction, and the bar will maintain the legs in external rotation, overcoming the tendency to internal tibial torsion. After three or four months of using the shoes and bar the deformity will usually be corrected and this treatment can be discarded.

Fig. 29. The lateral sleeping position with a blanket roll for support, used to overcome the deforming knee-chest sleeping position.

When the deformity is severe, as with the congenital type of metatarsus adductus, conservative care such as foot stretching, outflare shoes and an abduction bar may not suffice, and cast treatment is preferred. When casts are used, the foot is held in the overcorrected position of abduction and changed at weekly intervals (Fig. 32). Usually three to four weeks of casting will overcome the pigeon-toe deformity. If only the metatarsus adductus is present, a short leg cast will do. If tibial torsion is present, a long leg cast can be used with the knee flexed to 90 degrees and the tibia held in external rotation. Now both will be corrected. After plaster correction I like to keep these children in outflare shoes with an abduction bar* for three to four months.

* Many types of abduction bars are available. Infants will usually use an 8-inch bar, older children a 10-inch bar. In Figure 30 is a clamp-on type of abduction bar which attaches to the shoes as do roller skates. This bar can be easily removed so that the child can stand and walk in the shoes during the day and sleep with the bar at night. There is a control on each shoe for internal or external rotation. These bars are sturdy enough to be used over and over again. This type is manufactured by the Fillauer Surgical Supply Co. of Chattanooga, Tennessee, and retails for about 12 dollars.

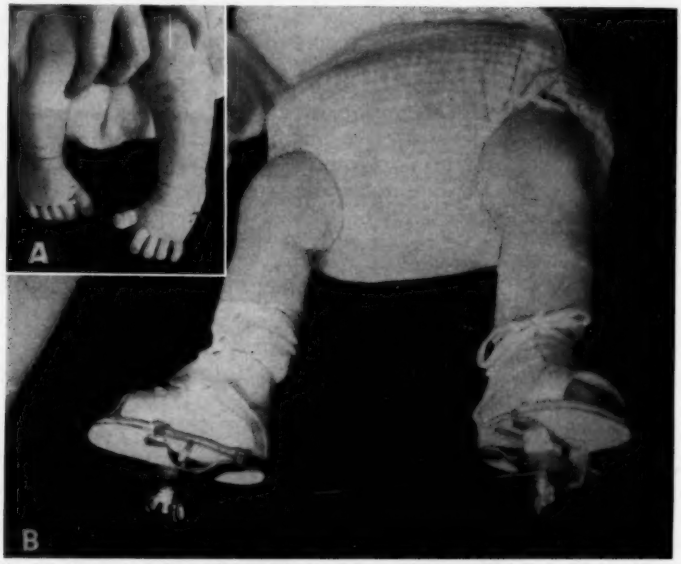

Fig. 30. Patient with moderate pigeon toes and internal tibial torsion (*A*) being treated with open-toe outflare shoes and an adjustable clamp-on type of abduction bar (*B*).

The congenital type of metatarsus adductus tends to recur and should be kept under observation for at least a year or more. The parents should also be instructed in daily passive stretching exercises of the foot into the overcorrected position of forefoot abduction. To properly stretch a metatarsus adductus, stand in front of the supine child's feet and grasp the right heel with the fingers of your left hand. Now place the thumb of your left hand on the lateral aspect of the midfoot. Then with the right hand grasp the area of the first metatarsophalangeal joint and force the forefoot into abduction, levering on the left thumb (Fig. 31) as firmly as possible without causing discomfort to the infant. This overcorrected position should be maintained for about 60 seconds. Do the same things to the other foot by reversing the position of your hands. This should be done a number of times during the day. I usually instruct the parents to do this stretching every time they change the child's diapers.

Treatment becomes more difficult as the child approaches the age of ambulation. When a patient is old enough to stand or walk, casting becomes a problem because it takes almost 48 hours for a cast to dry and harden. If the child stands or walks on the cast before it has had a chance to harden, it will be reduced to a soft mass incapable of maintaining the foot in the overcorrected position. It is almost impossible to keep a young child who can walk off his feet for 48 hours once a week while his casts dry. For this reason I feel that these children should be seen and treated early. If casting is required, it should be done before they are old enough to stand.

When treatment is started at three or four months of age, I frequently attempt to correct a metatarsus deformity by stretching exercises, the use of open-toed clubfoot shoes and an abduction bar (Fig. 30). If after a month or two I see that the foot is not correcting, I interrupt this treatment and use corrective casting for a month and then finish up with the open-toe outflare shoes and bar. But when a child is seen at six or seven months of age, it is probably wiser to start out with cast treatment and then follow up with the shoes and bar.

When the child is a year or more of age, treatment is even more complicated. Casting is usually not possible without resorting to bilateral long leg-hip spicas or at least long leg casts with the knees in flexion. This converts the child to a bed patient. If the deformity is severe enough, it may be necessary to do this.

Fig. 31.

Fig. 32.

Fig. 31. Foot stretching exercises for the mild pigeon-toe deformity and for follow-up care after correction with casts. The forefoot must be abducted with one hand while the rest of the foot is held firmly with the other hand.

Fig. 32. Corrective short leg casts which hold a pigeon-toe deformity in the overcorrected position. These are changed weekly with additional correction taken each time.

In this age group it may be impossible to get the child to sleep with an abduction bar. It interferes with his being able to turn over in bed and may awaken him many times during the night. This can cause so much commotion that the parents will abandon the bar. If such a child will not use an abduction bar, sleeping in outflare shoes may be of sufficient help to keep the patient's feet turned out even though he sleeps on his abdomen.

The pigeon-toed child from walking age on should have proper corrective shoes or shoe corrections depending on the degree of his deformity. In a general way any wedging of shoes which is placed on the inner aspect of the heel or sole will tend to make the foot toe-in. Any wedges placed on the outer aspect of the heel or sole will tend to make the foot toe-out. Thus, in a patient with a mild pigeon-toe deformity a regular shoe with ⅛-inch elevation to the outer sole may be all that he needs to bring the foot out of the adducted forefoot position.

At the other end of the scale with a severe deformity it is advisable to use a special corrective shoe. We previously talked about orthopedic corrective shoes for the flat foot deformity with a toed-in last. For this condition a shoe is made with a toe-out last or what is usually called an outflare shoe (Fig. 26, *D*). There are two good outflare shoes available in the United States for this purpose.* I usually prefer the Hack outflare shoe for the moderately severe deformities. When the deformity is extreme and there is an associated internal tibial torsion, I prefer the Tarso-Pronator Shoe. Surgical correction of these deformities is almost never indicated except for those pigeon-toe deformities which persist in a partially corrected clubfoot. Occasionally, long leg braces with a pelvic band are indicated for treatment of persistent severe tibial torsion.

One must not lose sight of the fact that the pigeon-toed child is not a crippled child in the ordinary sense. If he were to receive no treatment at all, he would still be able to walk and run and play reasonably well. He is likely to be clumsy and not good at athletics if the condition goes uncorrected, but he is not disabled. With girls there is an additional cosmetic factor, but again no true disability.

One of the problems with treatment of pigeon-toe deformities is that the special outflare shoes and outer wedgings tend to flatten the medial longitudinal arch. It is not uncommon with prolonged treatment of the pigeon-toed child for a flat foot to develop. Because of this it is advisable to stop the pigeon-toe correction as soon as pos-

* Several companies make an open-toe outflare shoe known as a clubfoot shoe for infants. These are frequently used attached to the abduction bars. A satisfactory inexpensive shoe of this sort is made by the G. W. Chesbrough Shoe Company of Rochester, New York. For the walking child an outflare shoe which is satisfactory is made by the Hack Shoe Company of Detroit, Michigan. The Maurice J. Markell Company of Yonkers, New York, makes an outflare shoe called the Tarso-Pronator. This is a more rigid shoe which has a hard counter on the medial side for the arch, but also has ⅛-inch wedges to the outer sole and heel of the shoes.

sible. I have on many occasions used the outflare shoes and wedges to correct the pigeon-toe deformity and then eventually treated the resultant flat foot with corrective flat-foot shoes and opposite wedgings. Once the deformity is corrected it will not tend to recur with the exception of the congenital metatarsus adductus. A good combination for a corrected metatarsus adductus which has developed a flat foot is an arch-supported shoe with a ⅛-inch wedge to the outer border of the sole. This will elevate the medial longitudinal arch of the foot. The tendency to toe-in again with this correction will be balanced by the outer sole wedge.

Occasionally a severe metatarsus adductus will not respond to conservative care as outlined above. Surgery may then be considered. Only soft tissue repair is advisable[12] (Fig. 33).

COMBINED DEFORMITIES

We have been discussing isolated deformities up to this point. At times we will see a combination of deformities. We may see a patient who has an obvious flat foot with loss of the medial longitudinal arch

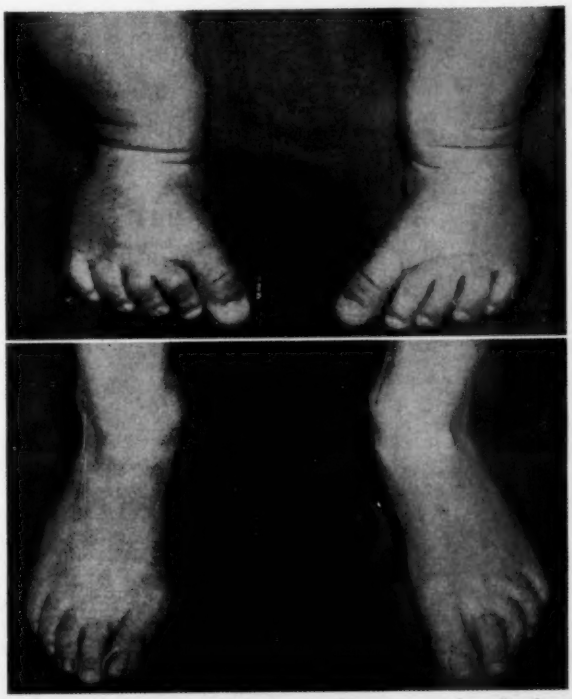

Fig. 33. Severe metatarsus adductus showing long-term end-result after treatment with soft tissue surgery. (From S. A. Thomson: *Clinical Orthopedics*, No. 16. Philadelphia, J. B. Lippincott Company.)

Fig. 34. Same patient as in Figure 25. This child shows a severe metatarsus adductus on the right foot, which also has flattening of the arch and moderate severe pronation. This is an example of combined deformities.

and pronation of the hindfoot. But instead of having an abduction or external rotation deformity of the forefoot, he has just the opposite, or a pigeon-toe deformity (Fig. 34). This can occur with a child who has a congenital type of flat foot and acquires a positional metatarsus adductus deformity from a position in utero or the knee-chest sleeping position after birth. Occasionally we see a child who is flat footed, but who does not like the abduction position of his forefoot when walking. He will attempt to elevate the medial longitudinal arch by toeing the forefoot in. His effort only succeeds in turning the big toe in, however, and does not elevate the arch itself. This patient, if fitted with corrective shoes, will eventually lessen his tendency to swing the big toe in. The child who has a congenital flat foot with a superimposed positional pigeon-toe deformity will best be treated with corrective shoes and a ⅛-inch elevation to the outer border of the soles. Be sure there is enough inner heel wedging to correct pronation.

SUMMARY

Deformities of the feet are numerous, and their treatment is a challenge. We have considered the diagnosis and treatment of flat feet, pigeon toes and certain related positional deformities.

Flat feet are primarily congenital in origin and due to hereditary laxity of ligamentous structures. On occasions the deformity can be acquired from positional deformities such as calcaneovalgus, and faulty sleeping and sitting habits. Diseases such as poliomyelitis and cerebral palsy will involve specific muscle imbalance factors. Malformations in the tarsal area may produce a painful spastic type of flat foot.

Treatment of the flat foot is primarily conservative, consisting of corrective shoes, shoe corrections, exercises, arch supports and on rare occasions surgery.

The pigeon-toe deformity can be congenital or acquired. The ab-

dominal and knee-chest sleeping positions are thought to be important etiologic factors. Treatment of the pigeon-toe deformity depends on the age of the child, but essentially consists in changing the child's sleeping habits as an infant, corrective casts, outflare shoes and splinting devices. The older child is usually treated with corrective outflare shoes or regular shoes with correction.

These deformities are rarely disabling, and operation is not usually indicated.

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MOLES, WARTS AND BIRTHMARKS

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Laymen have many misconceptions about skin blemishes in young infants and older children. Some mothers who soon expect to become grandmothers still fear that their pregnant daughters will have a baby "marked" because of prenatal physical or mental trauma to the mother. When the young infant or child displays some skin lesion of a congenital nature, some mothers, even with good educational backgrounds, think back to their child's gestational period for an explanation of the abnormality. Feelings of guilt may arise and must be allayed by the physician in a firm, consistent manner, usually repeatedly. Some mothers need continuous reassurance from their physician because of the many deeply established superstitions.

BIRTHMARKS

The practicing physician commonly encounters three different types of hemangiomas.

Nevus Venosus (Port-Wine Stain, Nevus Flammeus, etc.)

This hemangioma is most commonly seen at the nape of the neck, upper eyelids, and in a triangular area extending from the nose to a point in the midforehead. Larger and deeply staining flat lesions over any superficial area of the skin occur, but are less common. When they are superficial, as tested by blanching with pressure, the disfiguring marks are likely to fade spontaneously. The prognosis is poor in larger, deeper lesions. The most common stains on the neck, eyelids and forehead disappear spontaneously, usually by three years of age. It is best to ignore the others unless it seems best to treat them for cosmetic reasons if possible. The smaller lesions may be excised, but the larger ones are frequently untreatable. In proper hands some success with cosmetics and tatooing has been attained. However, the larger port-wine stains are extremely difficult to mask.

Capillary Hemangiomas

These are superficial, well circumscribed lesions commonly known as strawberry nevi. They appear at birth or shortly afterward, will commonly regress and may disappear. Treatment is indicated if any of them show signs of continued enlargement, especially in a vital area such as the genitals or about the eyes, ears, nose and mouth. Most of these will disappear spontaneously, however. Carbon dioxide snow, sclerosing fluids, radiation and surgery have all been used. Generally the most consistent results are obtained surgically, although other methods are usually successful in trained hands.

Cavernous Hemangiomas

These are poorly circumscribed, may be either deep-seated or superficial and are of varying sizes. Like the capillary hemangiomas, the cavernous type usually appears at birth or soon afterward. They generally enlarge before regressing, and few of them actually require any treatment. In vital areas they should be observed carefully, measuring them at intervals. Some will have associated capillary hemangioma, but this does not alter the treatment. In the occasional case in which it is felt that something should be done the choice of treatment is primarily dependent upon what is the best available in the area—radium, carbon dioxide snow or surgery.

WARTS

Warts are benign viral skin and mucous membrane lesions which are of four major types in children.

Verruca vulgaris or common wart is most commonly seen on the fingers and dorsum of the hands, but it may appear anywhere on the skin.

Verruca plana juvenilis—flat warts which tend to appear on the hands or face, particularly at the site of scratches.

Verruca plantaris are warts which occur on the plantar surface of the feet.

Verruca filiformis are slender threadlike warts which are of little concern in pediatrics.

The treatment of these lesions varies with their extent and location. Huckelberry Finn's use of a dead cat swung over the head in a cemetery at midnight is as effective as many other modes of treatment. Although the mechanism of the method was not understood, it was a psychotherapeutic one. Suggestion is estimated to be effective in 40 to 50 per cent of children with common warts.

Surgery is frequently of no true value because of the high incidence of recurrence and scarring. X-ray and radium should not be used because of potential dangers. The risk is not worth it in a condition which bears no threat to life.

Cryotherapy with carbon dioxide snow is of value in skilled hands,

but is painful. Electrosurgery using electrodesiccation followed by curettage of the base is frequently of value. Before treating warts one should always bear in mind that these lesions frequently undergo spontaneous remissions. Furthermore, the recurrence rate is high, so that therapeutic intervention is often unwise.

Plantar warts should seldom be removed because of the poor results and frequent disability following this procedure. Peeling agents have been used, but are of questionable value. They are also dangerous to use in children. Doughnut dressings to relieve pressure on the wart can be used over a period of several months, anticipating eventual spontaneous regression.

MOLES

Nevi in children are much more cellular than they are in the adult. Malignant changes in previously benign nevi are uncommon in the adult and rare in the prepuberal child.

The *intradermal nevus,* or common mole, is only of cosmetic importance. Treatment must be considered accordingly.

Junctional nevi occur most commonly in children and are of importance because of the danger of malignant change, even though such an occurrence is uncommon. These lesions are usually flat or only slightly elevated. They are larger than intradermal nevi, are hairless and vary in color from light brown to dark. Most of the nevi appearing on the palmar surfaces of the hands, the soles of the feet and on the genitals are junctional in children. All junctional nevi must be observed carefully. They should be excised if there is a change in color, if they start growing rapidly, ulcerate, develop a pigmented halo about them or if they are subject to constant trauma such as might occur in the beard area or on the soles. This nevus should be generously excised to ensure complete removal. The specimen should be inspected histologically by a competent pathologist. The greatest danger in excision is incomplete removal with possible spread of malignant cells by way of lymph channels or blood stream. X-ray and nonsurgical procedures, such as electrodesiccation and cryotherapy, are condemmed as inadequate and possibly dangerous. Nevi are radio-resistant. Other methods of treatment offer no assurance of complete removal, so that some nevus cells may be left behind to undergo neoplastic changes later.

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DIAPER DERMATITIS

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Diaper dermatitis or ammonia dermatitis is one of the most common skin conditions of the infant. This is an acute inflammatory condition, often occurring overnight and generally localized to the diaper area. It characteristically affects a concave area, such as the inner aspect of the thigh, abdomen, external genitals and buttocks, and other parts of the body when in prolonged contact with the ammonia of the converted urine. The inflammatory condition may be erythematous, papular, vesicular or ulcerative, or all forms may exist together.

CAUSE

Diaper dermatitis presents a distressing and prolonged problem for the parents unless they seek help from the physician. Since the turn of the century the condition has been described and differentiated from syphilis. The first real progress was made when Cooke[2] first isolated an organism which he demonstrated to be the cause of ammonia formation in the wet diaper. The organism, *Bacterium ammoneagenes*, was found in the stool and occasionally in the urine. The ammonia is produced by growth of the organism in an alkaline medium by the splitting-off action of ammonia from urea. Although most urine is acid, over a prolonged time the bacterial growth produces a more alkaline medium and consequently a more rapid growth. Other organisms have been shown to produce ammonia, but to a less degree. Brennemann[1] observed that ulceration of the external urethral meatus of the circumcised child was associated with ammonia dermatitis. This is not an infrequent occurrence, usually with some degree of stricture. inflammation of the glans penis, purulent exudate and occasionally urinary obstruction.

A common aggravating factor is the wearing of rubber or plastic panties which prevent evaporation of the urine. Strong alkaline soaps and detergents will also promote the condition if the diaper has not been properly rinsed in laundering. The healed ulcerative type will

often leave areas of hyperpigmentation, especially in dark-skinned infants. Ulcerative lesions may become secondarily infected or superimposed with impetigo contagiosa. Prolonged dermatitis will often leave the skin thickened and erythematous with a glistening surface. It will return to normal if adequately protected.

The age incidence is usually from the age of two months until the child ceases to wet the night diaper unless he is allowed to wear soiled diapers for a prolonged time. It has been observed that the breast-fed child is less likely to have diaper dermatitis, owing to greater acidity of the stool.

DIAGNOSIS

The diagnosis is usually simple. The acute skin inflammation is manifested by erythema, papules, vesicles or ulcers, singly or in combinations. The most characteristic aid to diagnosis is detection of the odor of ammonia in the wet diaper or by history, since the odor is most obvious at the first morning change.

Diaper dermatitis must be differentiated from perianal dermatitis, intertrigo, seborrheic dermatitis, moniliasis and congenital syphilis.

Perianal dermatitis of the newborn usually occurs in association with transitional stool and continues for two or three weeks. It is assumed to be associated with alkaline stools. Other forms of perianal dermatitis may be associated with enteritis, are sometimes due to digestion of skin protein, or may follow prolonged use of broad-spectrum antibiotics with resultant monilial overgrowth.

Intertrigo is usually found in the obese child where the skin is in apposition. It is found in the folds of the diaper area as well as other areas of the body.

Seborrheic dermatitis usually affects other areas of the body.

Moniliasis has become an increasing problem since the advent of the broad-spectrum antibiotics, and it is difficult to differentiate it from diaper dermatitis in the early stages. After adequate therapy for diaper dermatitis has failed the lesions usually present a more characteristic clinical picture. There are erythematous macules which spread peripherally and tend to clear in the center. The lesions will often spread beyond the diaper area. The condition may occur two or three days after the antibiotic therapy has been discontinued, so that these drugs may be overlooked as the cause.

Congenital syphilis usually has systemic manifestations and lesions on other parts of the body.

TREATMENT

The best therapy is directed toward prevention of ammonia formation. The duration is variable even with therapy or deliberate prophylaxis. There is a great variation in the amount of ammonia formed, and this

is sometimes associated with the amount of carbohydrate in the diet. Reduction of the carbohydrate content of the diet will often reduce the amount of ammonia formation. Usually when the condition appears, therapy should be initiated. After many years an economical nonvolatile and safe antiseptic for diaper treatment has been used to replace the less effective and toxic bichloride of mercury and boric acid. A quaternary ammonium compound was found by Niedelman[3] to be safer and more effective. The preparation is marketed as Diaparene Chloride. It is available as a precrushed tablet for diaper rinse. When wetted, Diaparene becomes actively bactericidal to the ammonia-producing organisms. When the organisms resist the antiseptic-impregnated diapers, water-miscible Diaparene Ointment provides increased antibacterial action.

Commercial diaper services use an antiseptic-impregnated diaper which is usually effective.

Another effective oral prophylaxis against ammonia formation is dl-methionine, one of the essential amino acids. The mode of action is based upon the fact that it lowers the pH of the urine and also promotes the appearance of an unidentified bacteriostatic substance in the urine. The lowering of the pH would seem to have less significance, since it has been demonstrated that the offending organisms can grow in an acid medium. Pedameth has proved effective and safe oral therapy. Each capsule contains 0.2 gm. of dl-methionine to be added to the daily formula.

The therapy for the inflamed skin usually represents a minor therapeutic problem after the cause has been eradicated. The cod liver oil preparations are safe and effective when used in conjunction with prophylaxis. Desitin ointment has proved to be effective in promoting healing for the erythematous phase of the dermatitis. Many topical preparations are available and recommended, especially preparations containing the steroids. These only add unnecessary expense to the treatment of a condition which will usually subside spontaneously after the chemical irritant has been removed.

The ulcerated, often purulent exudative and sometimes obstructed external urethral meatus may present an urgent problem. The obstruction will frequently recur, and the parents should be instructed to cleanse the meatus properly and keep it open. The resultant stricture may require meatotomy.

SUMMARY

Diaper dermatitis is caused by ammonia formation associated with bacterial growth. It is preventable by proper antiseptic care of the diapers, frequent changes and avoidance of plastic and rubber panties. The complications are secondary infections and external urethal meatal ulcers in the male. The diagnosis is usually simple, and when the condition is properly treated, the prognosis is excellent.

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ALOPECIA

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One of the conditions most distressing to child, parent and physician is loss of hair. Alopecia varies in severity from the loss of small patches of hair (alopecia areata) through complete loss of scalp hair (alopecia totalis) to the most severe form (alopecia universalis), in which all body hair is lost.

The cause is unknown, and as one would expect, the treatment is unsatisfactory. Alopecia areata generally involves the hair of the scalp, although the extremities or beard area may be affected, either singly or in multiple patches. Many methods of treatment have been used, all with poor results and frequently not reproduceable. Local stimulation is mentioned only to be condemned as ineffective. Generally the prognosis is good regardless of treatment.

The prognosis in alopecia totalis and universalis is much more dismal. In these patients epilation may occur relatively rapidly in a fulminating manner. At present the most popular treatment consists in the administration of corticosteroids. Lubowe advises methyl prednisolone for at least 6 months, 12 to 16 mg. daily for 4 weeks, increased to 20 mg. daily if no growth has occurred by then. If there is regrowth, the dose is reduced to the smallest amount which will still maintain hair, usually 8 to 12 mg. per day in divided doses. He uses monthly injections of 40 units of ACTH gel intramuscularly to stimulate adrenal cortical activity in adults. This treatment is satisfactory until the corticosteroids are discontinued, and then, unfortunately, many patients will again lose their hair.

As many as 90 per cent of these patients are reported to have psychogenic disorders, and this has prompted some observers to advise psychotherapy and tranquilizers for alopecia. Many cases of alopecia totalis or universalis which have rapidly followed severe emotional trauma are offered in support of this concept of a relation between the psyche and loss of hair. It is extremely difficult, however, to say in most cases which came first, the alopecia or emotional disorder.

So far as the eventual outcome is concerned, one can predict that the larger the area of involvement and the longer the period of

baldness, the poorer is the prognosis. Below 10 years and over 40 years of age the prognosis is more likely to be poor. Alopecia totalis and universalis carry an extremely poor prognosis, although there are some good reports when corticosteroids were used. Nevertheless the long-term benefits following steroid therapy remain doubtful.

Some families have used wigs, especially in little girls and older women.* They are costly, but probably worth while, expecially for female patients. Parents should be reminded, however, that below 8 to 10 years of age these wigs will soon be outgrown, perhaps in less than 18 months.

When hair does regrow, it is usually in two or three crops, the first being a sparse, fine, lanugo-like, light-colored growth. Successive crops are generally thicker and gradually assume the natural color. The denuded area generally remains less thickly covered than the normal scalp.

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* Wigs can be purchased through De Meo Brothers, 113 University Place, New York 3, N.Y.

POISON IVY DERMATITIS

JOHN H. DOYLE, M.D.

One of the most common and most annoying skin problems in the spring, summer and fall is dermatitis venenata caused by contact with various plants. French's *Index of Differential Diagnosis*[2] lists more than 100 different plants and trees capable of producing a contact dermatitis, and there are no doubt more. The most notorious offenders in this multitude of plants are members of the family Anacardiaceae—(*Rhus radicans*, poison ivy; *Rhus toxicodendron*, poison oak; and *Rhus vernix*, poison sumac). They are all attractive plants with glossy foliage and nice flowers and berries. For those unfamiliar with their appearance, detailed descriptions are to be found elsewhere.[5] The "poisonous" nature of the plants has been known for a long time. An interesting reference to the subject is that written in 1609 by Captain John Smith:

> The poisonous weed, being in shape but little different from our English yvie; but being touched causeth reddness, itchinge, and lastly blysters, and which howsoever, after a while they passe awaye of themselves without further harme; yet because for the time they are somewhat painefull, . . . it hath gotten itselfe an ill name, although questionlesse of noe very ill nature.[6]

Undoubtedly this sounds like a gross understatement to anyone who has suffered from a good case of Rhus dermatitis. Many members of this family of plants are useful to mankind, but still capable of producing a dermatitis—the cashew nut, India ink tree, mango, pistachio nut and the lacquer tree.

THE ANTIGEN

The antigens contained in these plants are primarily catechols which are unsaturated to a greater or lesser extent. One of the less important antigens was first synthesized in 1944. It is 3-pentadecylcatechol (PDC). This is a saturated compound and is therefore more stable and consequently less reactive chemically than the naturally occuring antigens. It is easier to standardize than the crude extract of ivy plants and has been widely used in patch testing. According to Kligman's[4]

work, the crude plant extract is 10 times more potent than the saturated pentadecylcatechol, weight for weight.

These allergenic juices are widely distributed in the plants, being found in the roots, stems, leaves and in the fruits, but not in the flowers, pollen or the epidermis. This means that contact with the intact epidermis of the plant is harmless and that in order to produce a dermatitis the plant must be bruised or otherwise injured. There is no difference in antigenicity in sap from various parts of a given plant and very little difference between different plants except that new shoots, as found in the spring and in shady areas, are more tender than the leaves found later in the summer and plants growing in the sun, which are more likely to have tough, "leathery" leaves. This fact would help explain why casual contact by the average person results in no reaction. It would also explain why the excellent results quoted for various preparations used to prevent poison ivy have not stood the test of controlled laboratory trials, as will be discussed later. The fact that the antigens are in the plant sap makes it evident that contact with the plant is not necessary in the sensitized person, since he may contact the sap from an article which has bruised a part of the Rhus plant, such as a shoe, tools, dogs, or from smoke in which there are particles of soot. The sap retains its antigenicity for an indefinite time if kept dry, whereas moisture renders it inert in a short time.[1] It must be remembered that the antigen is a highly potent one, and only minute amounts are necessary to excite a reaction in a sensitized person. This is the reason why a casual contact by a sensitive person can result in a generalized dermatitis in both exposed and nonexposed areas of skin.

IMMUNITY AND SENSITIZATION

There has been considerable confusion about immunity and sensitization. One continually hears tales of persons able to handle the plants without trouble. A short summary of all the scientific work in this field shows that anyone will become allergic if exposed to enough sap, frequently enough and over a long enough time. It is a matter of exposure and sensitization. There is no relation between the sensitivity to Rhus sap and to other types of allergies in a given person or in his family.

The interval betwen contact with the antigen and the appearance of the rash is variable, depending on a number of factors such as degree of sensitivity of the person and the amount of antigen contacted. The skin reaction usually appears within one to two days after contact. The duration of the skin reaction is likewise variable. It too depends somewhat on the degree of sensitization because the more severe the damage to the skin, the longer will the rash remain. In general, the rash persists for 5 or 10 days. Treatment, no matter what kind, does not tend to shorten the course of the affliction. One may control the symptoms, but not shorten the course.

TOPICAL PROPHYLAXIS

A considerable amount of work has been done in an effort to prevent development of the dermatitis before or after accidental contact with the poison ivy sap. Kligman[4] groups these measures into three types: (1) removal of the sap by washing or solvents; (2) barrier creams; (3) detoxicants (oxidizing and complexing agents).

The benefits derived from these attempts are dubious. It has been shown that washing has little merit under field conditions. A delay of more than 5 minutes after the contact in the very sensitive and 30 minutes in the mildly sensitive person is too long to prevent dermatitis. The same was found to be true for barrier creams and detoxicants. Kligman tested 34 different preparations over a 2-year period on a group of highly sensitive prisoners, and his conclusion was that "none had any effect."[4] This means that the antigen acts rapidly on contact with the skin and that the damage is done rapidly almost before any measures can be taken.

SYSTEMIC PROPHYLAXIS

As in most allergic conditions, many attempts have been made to desensitize or hyposensitize patients to the Rhus antigens. Those attempts have been made with varying results. Many materials and methods have been used, both the oleoresin or crude extract of the plant and the synthesized pentadecylcatechol, and the routes have varied from oral to intradermal to intramuscular. The conclusion is that some degree of hyposensitization, not desensitization, can be accomplished by any of these materials and routes if enough antigen is given.[3] The parenteral routes are less desirable because of the inconvenience of the injection to the patients and also because of the pain and other more severe reactions to overdosage. I do not use the injectable preparations. Conversely, the oral route allows the patient to take the material himself, and the side effects are not as dramatic if the proper dose is exceeded. Aqua-Ivy is a satisfactory preparation and should be given strictly as recommended in the package literature.

It must be emphasized that these procedures result in *hypo*sensitization and not *de*sensitization of the patient. Thus systemic prophylaxis should be used only on those patients who are exquisitely sensitive or those who are not so sensitive, but who must be in frequent contact with the plants. Hyposensitization results in milder attacks of dermatitis with less tendency to spread to other than exposed parts of the body. Attacks are of shorter duration. It does *not* prevent attacks except perhaps in those mildly sensitive people who would have very little trouble with the dermatitis in the first place. Furthermore, the hyposensitization is only temporary. After the full course the return to previous sensitivity begins in a few weeks, and the patient is as sensitive as ever in less than a year. Thus a maintenance dose is required. Another point to emphasize is that should the patient suffer poison ivy

dermatitis during hyposensitization, the program must be stopped until the dermatitis subsides. If this is not done, the dermatitis may become worse and perhaps even cause severe systemic symptoms.

SPECIFIC THERAPY

Therapy in Rhus dermatitis consists of topical measures and systemic measures. The topical treatment is one of the most confusing matters in medicine. A host of products have been used with presumed good results without consideration of the natural history of the disease. The preparations have been given the credit for what was done by nature. The best results topically have been obtained by using the standard dermatologic treatment for acute dermatitis, i.e. plain compresses of saline or Burow's solution and nonmedicated shake lotions. Even topical steroids have been disappointing. This is apparently because of insufficient tissue concentration, since the intradermal injection of minute amounts of steroids will suppress the skin reaction in that area. Topical therapy should simply aim at helping the skin heal itself by providing a clean, healthy environment for the necessary time.

The most significant advance in the therapy of Rhus and other contact allergies was the discovery and systemic use of the adrenal costicosteroids and the pituitary adrenal corticotropic hormones. The antihistamines, which should theoretically have been beneficial, proved worthless. Thus, with the exception of systemic steroids, there are no drugs which will alter the symptoms of Rhus dermatitis. We do not use the steroids on every case of this dermatitis, but we do not hesitate to use them if the symptoms are severe enough and are not controlled adequately with the conventional topical methods. The dose for steroids used systemically is that which is standard for the age and size of the patient. I usually use Metacorten or Aristocort. The steroid should be given for four to five days and then discontinued. The average patient will be completely recovered. If the symptoms recur when the steroids are stopped, they are resumed and used for two or three more days and again stopped. One need not worry about the adverse side effects of the steroids for this short period of therapy. It must be remembered that the steroids do not shorten the course. They only control the symptoms.

SUMMARY

1. Contact dermatitis caused by members of the plant family Anacardiaceae (poison ivy, poison oak and poison sumac) is very common.

2. There are contained in the plants closely related antigens which are unsaturated catechols. One antigen was synthesized in 1944.

3. Owing to the distribution of the sap in the plants, the leaves, stems, roots or other parts must be bruised or otherwise damaged before contact causes dermatitis.

4. Everyone would become sensitive to the plant sap if exposed sufficiently to it.

5. There is no satisfactory topical prophylaxis.

6. A person may be hyposensitized to the sap if enough of the antigen is given orally or parenterally, preferably orally. Hyposensitization is only temporary, and a maintenance dose is required.

7. Topical therapy should be directed towards allowing the skin to heal by itself by providing a healthy environment.

8. The most specific method of control of symptoms is by use of systemic steroids until the dermatitis can run its course.

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EARLY MANAGEMENT OF ACNE

CATHRYN C. HANDELMAN, M.D.

Acne vulgaris is a skin disorder that has its onset in the prepubescent and pubescent periods. It may appear as early as 8 to 12 years of age, but most commonly appears in the teens. As the child goes into his growth spurt you may notice an increase in the oiliness of his skin and hair. There is also a change in the perspiration. The hair needs more frequent shampooing, and an occasional comedo or "blackhead" may appear. This indicates the beginning of acne.

CAUSE

The parents and the child should try to understand the physiology of acne so that they know the reasons for the therapy. They must understand the future implication of this skin dysfunction. For this purpose pictures of severe cases impress some people, but one must know his patient to know when to use this approach. There is usually a mixture of comedones, pustules and papules in varying degrees of severity. The comedo is a plug formed by sebum and keratin which fills the pilosebaceous follicle. These plugged follicles may become infected by acne bacilli and staphylococci to produce the pustular stage of the disease. The usual sites are the face, neck, back, chest and arms. If treatment is started early, before the acne progresses, the prognosis is good.

During the prepubescent and pubescent periods there seem to be several factors which cause this condition and/or aggravate it. Glandular activity associated with an increase in sex hormones circulating in the blood stream causes a change in the oily secretion of the skin and a change in the nature of the perspiration. The oily secretion in some persons becomes thick and tenacious, plugging the pilosebaceous pores and causing comedones. Other factors predisposing to aggravation of the condition are menstruation, faulty diet, poor elimination, lack of rest, poor hygiene and anemia.

When the physician sees the child for routine physical examinations, illnesses or immunizations, it is wise to note the condition of

the skin of the face. Look especially for comedones around the nares, on the chin, near the tragus of the ear, in the pinna and around the forehead, particularly if the patient is approaching puberty. This is the time to institute preventive measures—the time to try to prevent progression to pustulation and scarring. We are not considering the severe cystic forms, which belong in the hands of a dermatologist. The physician must be positive in his approach in handling children who are beginning to develop comedones and must enlist the proper co-operation of the parents.

Some authors make the statement that they doubt that hygiene is an aggravating factor since they have seen severe cases of acne in the best of families. I am inclined to take issue with this to a certain degree. When one does not *live* with the child, it is impossible to really know his hygienic habits. I have known children and young people who bathe daily, using soap and water over the body, but somehow they merely wet the face without thoroughly cleansing. I have known pubescents who have been instructed about the care of the face when comedones and pustules were a problem. Upon return visits there may be no improvement, and may even be progression. They may then admit that they have been negligent, *actually washing* the face *maybe* once a day. I mention this to emphasize that we must be extremely positive in all our instructions to both children and parents. We must question them about their performance. Parents should start the children on their regimen by supervising the ritual the first few days. The discussion with the child and parents must include the following subjects: (1) daily care of the skin and hair—bathing, (2) diet, (3) rest, (4) exercise, (5) elimination, (6) other.

In my discussion with the patient I urge him to stay with a physician for treatment. Any knowledge which others might have about the subject comes from the medical profession. The patient can be comforted with the thought that he is not the only one afflicted with acne. Sixty to 70 per cent of all adolescents have *some* degree of this skin disorder. He should know that the condition is self-limited and that it usually disappears after the age of twenty. However, to prevent progression of the condition and possible scarring, he must realize the importance of following instructions carefully. The mother must help carry out the regimen. A drying lotion may be prescribed for use at night. Girls may also wish to use a drying lotion during the day to hide blemishes.

TREATMENT

Care of the Skin and Hair

The child should bathe daily with warm, not hot, water and soap. Shampoo the hair with a nongreasy preparation as often as necessary to remove excess oils. The face should be washed three times daily, and the type of soap used must be specified, depending upon the degree of involvement and the effects desired. If there are only a few comedones, a mild soap such as Dial may be used. If there is more

involvement, a sulfurated soap such as Fels-Naphtha or a pharmaceutical product such as Fostex, pHisoHex or Sulfo-lac may be used. These are used to produce a keratolytic effect as well as to cleanse. The parents and children must be told that the irritating effect is desired, but if the skin is too dry and irritated, stop the preparation for three or four days. Use a mild soap, such as Ivory, and then return to the prescribed product.

Washing must be done in a certain manner. The hands, palms and backs, must be washed quickly with this lather and warm water and quickly rinsed with warm water. A soft wash cloth or sponge is lathered, and the face is washed thoroughly but gently, taking three or four minutes. Rinse thoroughly with warm water and finally with cold water. One can see that this is time-consuming, but it is worth while if carried out daily. The length of washing may be reduced if the comedones are few and the skin is not too oily.

The hair may have to be washed every other day. A good, greaseless shampoo may be used, or a pharmaceutical preparation such as Fostex cream may prove more satisfactory. The lather should be worked thoroughly into the scalp two or three times, rinse thoroughly two or three times and finally rinse with a lemon, not a creme rinse. Boys may wash their hair under the shower daily. Comedones and pimples should not be squeeed.

It is appropriate to mention the permanent wave and hair dryer in connection with the management of acne. The permanent wave has a temporary drying effect which is short-lived in the girls with acne. There seems to be an increase in oiliness after about two weeks, and the acne is aggravated. Therefore, while the skin is vulnerable to exacerbations and extension of the condition, it would be wise to advise your patient against a permanent. Her hair should be short, less than shoulder length, and kept thinned. Sitting under a dryer may also aggravate the condition. If possible, it is best to let the hair dry naturally or keep the dryer set at "warm."

Diet

Diet seems to play some part in the control of acne. Fried foods, fatty food, chocolate, coffee, colas, shell seafood, nuts, peanut butter, sharp cheese, iodized salt and oranges should be eliminated from the diet. Milk may be an offender so that a trial period without it in the diet may be desirable. Again we must inform the adolescent and parents that these items may be offenders. We realize that people in this age group want to do things together with the gang. Your patient must be told that for him a glass of limeade must replace the coke. Eat sherbet instead of ice cream. Substitute an apple for chocolates.

Other Measures

Adequate rest is important, since fatigue aggravates this condition. Outdoor exercise is helpful. The adolescent should choose a sport to his liking—swimming, tennis, golf, hiking—and try to participate daily.

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Other Measures

Adequate rest is important, since fatigue aggravates this condition. Outdoor exercise is helpful. The adolescent should choose a sport to his liking—swimming, tennis, golf, hiking—and try to participate daily.

Elimination should be controlled by fruits and vegetables in the diet. Laxatives should be the last resort. If the diet fails, products such as Malt Soup Extract may be tried. The mother must serve balanced meals. Towels and pillow cases should be changed every day; foam rubber pillows rather than feather pillows are preferred. Hair brushes and combs should be washed frequently. Girls should avoid the use of cosmetics except for lipstick. Boys should not use greasy shave creams. Most of them can shave dry with an electric razor at this age.

Katz and Scott investigated cutaneous changes in girls during the menstrual cycle. The skin, as well as other tissues, takes on extra fluid premenstrually. Because of this finding they used an oral diuretic with moderately good suppressing effects on premenstrual flare-up of acne. More recently Cormia used chlorothiazide (Diuril) in 20 patients. He gave 500 mg. twice daily for 10 days preceding menses and 3 days thereafter. *Exacerbation* of *acne* was suppressed in 18 cases and influenced favorably in the other two.

It cannot be stressed enough that all these measures do not constitute a cure, but that they are preventive measures. Their purpose is to keep the comedones down and keep them from pustulating and scarring. This must be impressed upon the child, because he may feel that all his efforts are futile if he continues seeing "blackheads" and an occasional pustule.

If comedones are numerous, a weekly visit to the office at a specified time may be arranged to express some of these at each sitting. This is accomplished by the use of a comedo extractor in the hands of a nurse or physician. Warm compresses are used on the face for a few minutes. An area is selected and the comedo punctured with the sharp end and expressed with the blunt end which contains a hole.

Girls in private schools and those in some public schools are given charm courses. For others, if there is a charm school in your city, it would be advantageous to refer those with acne for instructions on charm in order to give them more poise and confidence by stressing their attractive points. If there is no such facility available, the mother can work at this with her child. The physician may have to point the way by calling attention to the expressive eyes, trim ankle, good figure or vivacious personality.

Medications

One dermatologist[1] whom I know has been gratified with his results from the use of Vi-Dom (Dome Chemical Co.) for the past 1½ years. In addition to the local care of the skin with Dial or Septisol, he gives his patients a 75,000-unit tablet twice or three times a day to be dissolved in the buccal cavity or under the tongue. He uses no creams and reports remarkable improvement.

Local preparations have not changed much in the past 50 years. Shaw and LaFebra, in their *Diseases of Children* (Vol. IV) state that as a keratolytic agent, sulfurated resorcin is used. Some of the formulas used today are as follows:

Zinc sulfate	8.0 gm.
Potassium sulfuret	8.0 gm.
Glycerin	20.0 cc.
Lime water ad	8.0 cc.

At bedtime

Zinc sulfate	4.0 to 6.0 gm.
Sulfurated potash	2.0 to 4.0 gm.
Rose water ad	120.0 cc.

If the skin is oily, apply 70 per cent alcohol or acetin before applying lotion.

12% camphor powder 25% aa boric-acid	sulfur
Starch Talcum	aa parts to 100%

Occasionally one may see some beneficial results from steroid-containing lotions used over a short period of time. Some proprietary products are listed in Table 10. If pustules are present over the face or body and cannot be controlled by hot compresses, antibiotics may be beneficial. Loveman and Hammond[2] report improvement and suppression of infection and pustulation in their series of cases.

When this skin affection is controlled, there is no need for referral to a dermatologist. But if there is still progression of comedones and pustules, the child should be referred to a dermatologist. We rarely have to do so.

The principles of treatment in the milder cases are as follows: (1) Maintain a good personal hygiene and follow given rules of health. (2) Cause a mild peeling of the epidermis with face washing as indicated to ensure patency of the sebaceous orifice. (3) Reduce sebaceous gland activity, if possible, by diet and local therapy. (4) If local infection appears, treat as any other infection. These should be explained to the patient so that the length of therapy does not discourage the youngster.

The dermatologist should be consulted for more severe cases. Ultraviolet rays may be used in desquamating doses. The desired action must be explained. Autogenous vaccine for pustular cases is sometimes efficacious. Roentgen rays should be reserved as a last resort and should not be used under 16 years of age if possible.

SUMMARY

We can do some preventive work with our young patients by spotting the prepubescent and pubescent comedones early and instituting a hygienic regimen and keratolytic procedures. A number of satisfactory soaps and products are available. The child and parents must realize the importance of strict adherence to the regimen you outline for them. The more pronounced cases must be treated both physically and psychologically.

TABLE 10. *Commercial Products Used in Treatment of Acne*

PRODUCT	MANUFACTURER	PRINCIPAL INGREDIENTS	USES
Acnomel (cream and cake)	Smith, Kline and French 1500 Spring Garden St. Philadelphia 1, Pa.	Hexachlorophene 0.25% Resorcinol 2.0% Sulfur 8.0% Alcohol 11.0% (Cake ½ strength)	Cream: greaseless, flesh-tinted. Apply after washing skin (do not rub) once a day Cake: apply with moist sponge 2-3 times a day. May be used as makeup base
pHiso-ac Cream	Winthrop Laboratories 1450 Broadway New York 18, N.Y.	Colloidal sulfur 6.0% Resorcinol 1.5% Orthophen 0.3% Alcohol 10.0% In stable cream base	Various uses, as in acne, seborrheic dermatitis, etc.
pHisoHex		Entsufon, lanolin, cholesterols, petrolatum and hexachlorophene 3%	Antiseptic detergent for cleansing skin, scalp and genital mucous membranes. Adjunct in dermatologic practice (acne, infected dermatosis, impetigo, diaper rash), 3-4 minutes 3 times a day
Fostex (cake soap)	Westwood Pharmaceutical Co. Division of Foster Milburn Co. 468 Dewitt St. Buffalo 13, N.Y.	Sebulytic (lauryl sulfoacetate, alkyl aryl polyether sulfonate, dioctyl sulfosuccinate) Sulfur 2% Salicylic acid 2% Hexachlorophene 1%	Used for therapeutic washing of the skin in relatively less oily acne, seborrhea and other skin conditions requiring degreasing, peeling and degerming actions Massage for 5 minutes, rinse; if skin gets too dry, discontinue temporarily
(cream base)		Same as cake soap	For therapeutic washing in acne when the skin is very oily and comedones are abundant. Provides maximum degerming action. Excellent shampoo in dandruff and oily scalp
Sulfa-lac	Kelgy Laboratories New York 35, N.Y.	Colloidal sulfur Sol. sulfurated lime Zinc sulfate Glycerin Rose essence	Various uses as in acne, seborrhea, etc.

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BITES AND STINGS

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From time immemorial man has been subjected to the bites and stings of insects. To a less degree he has also been the victim of the bites of many animals, both wild and domestic, with which he may have occasion to come in contact. The effects of these various injuries range from those of mere annoyance and discomfort to major illness and economic loss up to and including death itself. We shall briefly discuss some of the most common of these conditions as they are seen in the average office practice and suggest methods of treatment. The role of insects as vectors of disease is a subject outside the scope of this article.

INSECTS

For purposes of simplicity and in line with common medical and lay usage, the term "insects" will be taken to include the class Hexapoda (bugs, lice, flies, mosquitoes, bees, wasps and hornets) and the class Arachnida (spiders, ticks and mites). Mechanical injury due to penetration of the skin by the biting or sucking organ of the insect always occurs to a greater or less degree, but by far the most frequent and severe reactions are caused by the injection of toxic, irritating or lytic substances.[1] Generally speaking, persons with an allergic tendency seem to have more severe reactions than those without this tendency, and repeated exposure frequently results in increasingly severe reactions. Nevertheless the phenomenon of spontaneous desensitization following prolonged and repeated exposures has often been observed.

A common type of skin hypersensitivity reaction, seen more often in children than in adults, is *lichen urticatus*. This is described as a skin eruption consisting of deep shotty papules with no characteristic distribution and accompanied by intense itching. A seasonal occurrence is usual, although in very sensitive children the condition may persist during the entire year. Many insects have been implicated in the production of such a reaction, but it seems clear that there is no single etiologic agent.[8] Treatment consists in an attempt to eliminate the

offending insect plus the use of antihistamines and, in more severe cases, corticosteroids. Secondary infection resulting from scratching is treated in the same manner as any other superficial skin infection.

Mosquitoes

In the United States the most common bites of infants and children are those of mosquitoes. They are seasonal, occurring most frequently during the warm months, usually multiple, and as a rule are found most often on exposed and unprotected areas of the skin, though mosquitoes are capable of biting through thin or loosely woven clothing. The bite produces a slight but appreciable sting followed in a short time by an itching urticarial wheal. In sensitive children the reaction may be severe, ranging from vesicular and bullous lesions to an extensive edema resembling a cellulitis. Newborn infants may show no appreciable reaction to mosquito bites, especially initial ones, since they are usually not sensitive.[16]

Treatment is directed toward the relief of itching. This is not only a symptomatic measure, but will also reduce the incidence of secondary infection due to scratching. This can be accomplished by the use of antihistamines. We especially favor Temaril in doses of 2.5 mg. 3 times a day because of its excellent antipruritic action. The drug is available in tablets, liquid or long-acting spansules. Lotions or ointments containing menthol, phenol or camphor are helpful for local application, but preparations containing potentially skin-sensitizing compounds, such as the "caine" derivatives, should be avoided. Quotane ointment or lotion is an example of a product which fulfills the necessary requirements.

Spiders

Although spiders are found everywhere, they are unjustifiably blamed for more bites than actually occur merely because they happen to be found in the area. The only spider of any medical importance is the black widow. It has a characteristic and easily recognized appearance. The bite is usually single and consists of two puncture marks with a surrounding red hive reaction. The bite itself is painful and is usually followed by systemic symptoms which begin from 10 minutes to several hours after the bite. These consist of tremor, abdominal pain, rigidity of the abdominal muscles, restlessness, nausea, vertigo, headache, diffuse perspiration and difficulty in speech. There may be a 30- to 40-mm. rise in blood pressure. The venom is neurotoxic and causes an ascending paralysis as well as damage to peripheral nerve endings. The outcome is dependent upon the general physical condition of the patient, the amount of toxin injected and the rapidity with which treatment is started.

Treatment consists in the use of 10 cc. of 10 per cent calcium gluconate intravenously as often as necessary to control the muscle spasms. Intravenous corticosteroids are also given. A specific antivenom is available and is useful if given early. This is a horse serum product, and

the usual precautions attending its use should be observed. Nonspecific measures include the use of phenobarbital and morphine and the giving of warm baths for relaxation and the relief of pain. The mortality rate is about 5 per cent without the use of antivenom.

Bees, Wasps and Hornets

Children are frequently stung by these insects. Their summertime play habits, innate curiosity and scanty dress during warm weather make them particularly vulnerable. The bee is the only one of these insects whose stinger remains in the wound. This is important for reasons of identification and because the venom sac, which is frequently torn loose with the stinger, continues to pump venom for several minutes. An attempt should be made to remove the stinger by expressing it with gentle pressure. If this is not sucessful, it should be cautiously removed with a pair of tweezers, being careful to express as little venom as possible into the wound.

Local reaction at the sting site consists of a rapidly forming wheal frequently accompanied by swelling of the surrounding skin and attended by a stinging and/or itching. Treatment of this phase is essentially the same as that described for mosquito bites. In addition, the use of cold compresses of Burow's solution often gives relief from the itching and swelling.

Far more important, but fortunately less frequent, than the local reactions which occur in the majority of patients are the severe generalized reactions sometimes seen in sensitive persons. These reactions generally happen after a patient has been sensitized by at least one prior sting. The clinical picture resembles that of anaphylactic shock with varying degrees of severity, sometimes even causing death. It is possible that this occurs more commonly than is recognized. Many of the sudden deaths attributed to heart failure and heat prostration during the insect season may be due to this cause.[13]

It is generally agreed that the majority of patients who exhibit this severe type of reaction give a personal or family history of allergy and that the more severe the reaction, the shorter is the time interval between the sting and the appearance of symptoms. Symptoms may be any or all combinations of the following: generalized urticaria, itching, malaise, anxiety, generalized edema, constriction in the chest, wheezing, abdominal pain, nausea and vomiting, vertigo, dyspnea, dysphagia, hoarseness or thickened speech, confusion, feeling of impending disaster, cyanosis, fall in blood pressure, collapse, incontinence and unconsciousness.

Treatment is divided into two distinct phases—the handling of the immediate life-threatening emergency and an attempt to prevent the recurrence of such an episode. Immediate therapy involves the use of 1:1000 aqueous epinephrine, antihistamines and corticosteroids, preferably intravenously, either singly or together. When an extremity is the sting site, the use of a tourniquet proximal to the sting may slow release of toxin into the general circulation.

The Upjohn Company manufactures an excellent corticosteroid

package under the trade name of Solu-Medrol. It is ideal for emergency use and can be carried in the physician's bag without loss of potency. The package contains 40 mg. of Medrol powder separated by a rubber plug in the same vial from a compartment containing the diluent. The plug is easily displaced by pressure upon a flexible diaphragm. This permits easy mixing of the two components without contamination. The resulting solution can then be withdrawn into an ordinary syringe and injected.

After recovery, while the second phase of therapy is under way, the patient should be instructed to carry with him at all times some antihistamine tablets and Isuprel 10-mg. sublingual tablets. These are

TABLE 11. *Manufacturers of Bee and Wasp Extracts*

MANUFACTURER	PRODUCT
Hollister-Stier Laboratory 2031 N. 63rd St. Philadelphia, Pa.	Graduated dilutions of bee, paper wasp and yellow jacket—separate or in mixture
Cutter Laboratories 4th & Parker St. Berkeley 10, Calif.	Graduated dilutions of bee extract
C. E. Blatt Independence, Mo.	Powdered, dried, defatted paper wasp; bee body for making extracts
Southwest Mold & Antigen Laboratory 1009 Northeast 17th St. Oklahoma City, Oklahoma	Powdered, dried, defatted paper wasp; bee body for making extracts
Sharp & Sharp 3402 Norton Ave. Everett, Washington	Powdered, dried, defatted paper wasp; bee body for making extracts
Steman Laboratories 1205 Northeast 18th St. Oklahoma City, Oklahoma	Powdered, dried, defatted paper wasp; bee body for making extracts
Center Laboratories 748 Sterling Place Brooklyn 16, N.Y.	Powdered, dried, defatted paper wasp; bee body for making extracts

From H. L. Mueller and L. W. Hill: *New England J. Med.*, 249:726, 1953.

to be used at once if he is stung again. Aqueous epinephrine, 1:1000, and a sterile syringe and needle, with instructions for its use, should be kept in readiness in the home at all times.

It has been shown that cross-antigenicity exists between the stinging insects making up this group.[7] These antigens are present throughout the insect's body independently of the venom,[15] although the venom contains a small amount of the antigen. Mueller[13] carries out skin testing with extracts of individual stinging insects, but desensitization is done with multivalent extracts, beginning at that dilution which first gives a positive skin test (See Table 11). Injections are given once or twice weekly in gradually increasing strengths until tolerance is reached or until a dose of 0.2 or 0.3 cc. of a 1:100 dilution is attained. Thereafter maintenance doses are given every four weeks during the insect season and every six weeks during the winter for three years. An

occasional patient when stung again after this regimen will exhibit a generalized reaction. This is an indication for an attempt to reach a more concentrated desensitizing dose than is usual for the average patient. The results following this plan of treatment and a similar one reported by Stier and Stier[18] are excellent.

Chiggers

These pests are found in areas well covered with vegetation. They attach themselves to human and animal hosts in order to feed upon their blood. The nodular skin reaction and intense itching they produce are believed to be due to the material injected to produce necrosis of the skin and to prevent clotting.[9] Lesions are usually confined to areas where there is constriction of clothing—about the waist, beneath garters, and elsewhere. Bites may be found almost anywhere on children, however, owing to their play habits and scanty clothing.

Prevention is the best treatment. This consists in the use of repellants (benzyl benzoate, Stay-way, Off) for the individual and toxic sprays (Chlordane) for area control. Bites are best treated with Temeril by mouth and/or Quotane ointment or lotion locally for relief of itching, together with the usual measures for control of secondary infection induced by scratching.

Fleas

Fleas are found everywhere. The papular urticarial eruption produced by their bite probably represents an allergic reaction to injected antigen. Bites are usually multiple and grouped together. They are also found most often in areas where clothing fits snugly or constricts. As a rule, most or all of the family group is affected. Infected animal hosts, such as the dog and various farm animals, are the most common source of infestation.

Treatment is primarily prophylactic, consisting in the use of 5 per cent DDT or 1 per cent Lindane as a dusting powder to the patient, his clothing and bedding. The same substances are applied to the suspected animal hosts and used in the areas where they are kept. Specific measures for the treatment of the bites are essentially the same as those previously mentioned for the relief of itching and the control of secondary infection.

Fire Ants

The fire ant was imported from the tropics. It has become an increasingly serious problem in the United States since its spread to the southern portions of this country. It attacks man upon the slightest provocation with aggressive viciousness. It inflicts both a bite, as it fixes itself to the skin with its mandibles, and multiple stings. Using the fixed head as a pivot, it may sting at several different sites. The

characteristic grouping of stings centered around the two minute bright red hemorrhagic puncta caused by the bite is an aid in diagnosis.[4] The bites, although painful initially, are inconsequential and require no treatment. Reactions to the stings are both local and systemic. The initial local reaction is a wheal which usually forms within minutes followed in about 24 hours by vesiculation, pustule formation which remains for 3 to 10 days, and then crusting. Scar formation is common. Systemic reactions consist of fever and allergic manifestations. Most commonly these consist of generalized urticaria and edema, dysphagia, dyspnea, anxiety and bronchial asthma.

Local treatment with various drugs, including antihistamines, antibiotics and corticosteroids, has proved uniformly disappointing.[4] Injections of 1:1000 epinephrine and antihistamines have been found useful in combating the systemic reactions.[6] No mention is made of the use of parenteral corticosteroids, although we can see no reason why they should not be effective.

Ticks

Ticks are important principally as vectors of disease, among which are the Rickettsiae and tick bite paralysis. The local bite reaction is innocuous, although a foreign body reaction may develop if fragments of the biting arthropod are carelessly left in the skin or improperly removed. Various methods of detaching ticks in toto have been advocated—heat from a match or red-hot needle, covering the area with mineral oil or petrolatum jelly, spraying with ethyl chloride or dousing with ether. The important thing to remember is to leave no part of the tick buried in the skin. The bites themselves require no treatment other than the usual hygienic measures.

Bedbugs

Bedbugs usually feed at night, biting people as they sleep. The bites are usually multiple and occur in an irregular linear fashion. This, plus the presence of spots of blood on bed linens and bed clothing, should make one suspect the diagnosis. Bedbugs may sometimes be found by turning on the lights and examining the bedding carefully after having been in bed with the room darkened for a time. No treatment is usually required for the bites. Spraying or dusting with 5 per cent DDT or 1 per cent Lindane is an effective control measure.

ANIMALS

Although animal bites are not nearly as frequent as insect bites, they are, as a rule, much more serious, not so much because of the trauma inflicted, but because they may serve as the portal of entry for rabies. Care of the wound itself embodies the general principles applicable to any wound regardless of etiology. Cauterization of the wound with

fuming nitric acid or formalin is no longer an accepted procedure. Thorough cleansing with soap and water has been shown to be a superior method of treatment so far as the incidence of infection is concerned.[17] The prophylactic use of antibiotics is not recommended. They should be used only if infection develops in the wound. A tetanus toxoid booster should be given routinely to those children who have been immunized previously, particularly if the wounds are deep and penetrating. Children who have never received tetanus toxoid should be given antitoxin. Bites about the face may cause severe disfigurement and may require the services of a plastic surgeon.

Dog Bites

Rabies is by far the most important complication of dog bites. The incubation period varies considerably, depending on the location of the bite in relation to the central nervous system. Bites of the face and head have a shorter incubation period than those of the lower extremities. The incubation period in children is also shorter than in adults for comparable bite sites. Contamination of mucous membranes is much less dangerous than bites, and contact of infected saliva with the intact skin carries little or no danger.[10]

The first impulse of an angry and distraught parent whose child has been bitten is to kill the animal or have it killed. This is a mistake. Whether the animal is rabid is more easily determined while he is alive. The name and address of the owner of the dog should be reported to the proper health authorities. Most health regulations require that the suspected animal be restrained for two weeks and be examined by a veterinarian. If the dog is free of evidence of disease at the end of this time, it does not have rabies. These recommendations obviously cannot be followed when the animal involved is a stray or when the owner is not known. Unless the wounds which are inflicted are deep and near the central nervous system, there will be plenty of time to wait for the animal to exhibit signs of rabies before starting treatment of the person who has been bitten.

Heretofore the use of emulsified rabbit brain tissue vaccine was the only means of specific treatment available. It carried some risk, the most serious of which was the development of encephalitis. With the advent of duck embryo vaccine the risk of this serious complication has been removed. Table 12 presents the recommendations of the World Health Organization for the treatment of persons who have suffered possible exposure to rabies.

Although the preceding discussion concerning rabies has been confined to its transmission by dog bites, there are many other animals capable of infecting human beings—horses, cows, pigs, sheep, goats, mice, squirrels, foxes, wolves, bats and even birds. The general principles outlined above apply to the treatment of these bites in essentially the same way.

TABLE 12. *Indications for Specific Postexposure Treatment for Rabies*

NATURE OF EXPOSURE	CONDITION OF ANIMAL		RECOMMENDED TREATMENT
	At Time of Exposure	During Observation Period of 10 Days	
No lesions: indirect contact only	Rabid		None*
Licks:			
1. Unabraded skin	Rabid		None*
2. Abraded skin and abraded or unabraded mucosa	(a) Healthy	Healthy	None
	(b) Healthy	Clinical signs of rabies or proved rabid	Start vaccine at first signs of rabies in animal
	(c) Signs suggestive of rabies	Healthy	Start vaccine immediately. Stop treatment if animal is normal on 5th day after exposure†
	(d) Rabid, escaped, killed or unknown		Start vaccine immediately
Bites:			
1. Simple exposure	(a) Healthy	Healthy	None
	(b) Healthy	Clinical signs of rabies or proved rabid	Start vaccine at first signs of rabies in animal
	(c) Signs suggestive of rabies	Healthy	Start vaccine immediately. Stop treatment if animal is normal on 5th day after exosure†
	(d) Rabid, escaped, killed or unknown; or any bite by wolf, jackal, fox or other wild animal		Start vaccine immediately
2. Severe exposure (multiple; or face, head or neck bites)	(a) Healthy	Healthy	Hyperimmune serum immediately. No vaccine as long as animal remains normal
	(b) Healthy	Clinical signs of rabies or proved rabid	Hyperimmune serum immediately, but start vaccine at first sign of rabies
	(c) Signs suggestive of rabies	Healthy	Hyperimmune serum immediately, followed by vaccine. Vaccine may be stopped if animal is normal on 5th day after exposure
	(d) Rabid, escaped, killed or unknown. Any bite by wild animal		Hyperimmune serum immediately, followed by vaccine

From World Health Organization, 1953.
Hyperimmune serum to be effective must be given within 72 hours of exposure; dose, 0.5 ml./kg. of body weight.
These indications apply equally well whether or not the biting animal has been previously vaccinated.
* Start vaccine immediately in young children and patients when a reliable history cannot be obtained.
† Alternative treatment would be to give hyperimmune serum and not start vaccine as long as animal remained normal.

Snake Bites

Poisonous snakes are found in almost every state of the Union. It is estimated that the incidence of snake bites may range as high as 3000 per year.[14] Fortunately, however, the death rate is exceedingly low, probably not over 10 to 20 per year. With the increasing popularity of outdoor sports such as camping, hunting and fishing together with the increase in leisure time to enjoy these activities, it is possible that the incidence of snake bites may increase. For this reason every physician should learn the types of snakes indigenous to his section of the country and the methods of treating the bites inflicted by them. The vast majority of poisonous snakes in the United States are the pit vipers, which include the rattlesnake, copperhead and cottonmouth or water moccasin. The action of their venom is largely proteolytic and cytolytic, although it may also have a slight neurotoxic effect.[19] The coral snake, which is related to the cobra, is found in lesser numbers and is confined almost entirely to the southern states. The venom of this snake is chiefly neurotoxic, and death may be caused by bulbar paralysis.[12]

There are certain basic principles about snake bites upon which most investigators are agreed.[11]

1. Children and Old People Are Most Susceptible. The ability to withstand a given amount of venom is directly proportional to body weight.

2. Location of the Bite. Bites on an extremity are less dangerous than those on the head or body.

3. Depth of the Bite. Superficial bites are less dangerous than those penetrating a muscle. Envenomation into a vein may result in sudden death.

4. Size of the Snake. Generally speaking, the larger the snake, the more venom there is injected.

5. Degree of Activity Following the Bite. The acceleration of spread of the venom seems related to some extent to the amount of activity of the patient.

6. Species of Snake. Venoms of various species have varying degrees of toxicity.

7. Time Factor. The sooner treatment is begun, the more favorable is the outcome.

There is a wide divergence of opinion as to certain aspects of the *treatment* of snake bites. Some of these opinions undoubtedly date back to a time when no other treatment was available. Others are based upon the results of animal experiments which have not proved completely applicable to man. Complete agreement exists, however, on the generous but judicious use of antivenin both locally and systemically.[2] Immobilization of the affected part and chilling for the relief of pain until antivenin can be administered are also considered acceptable procedures. Early, wide excision and suction have limited application for the removal of venom and necrotic tissue, but the use of this form of treatment would be impossible on the foot, ankle,

anterior surface of the lower leg, hand and forearm, the most frequent sites of snake bites. Use of this method of treatment, when applicable, would entail plastic surgical repair at a later date.

The patient should be hospitalized if at all possible, and blood typing and cross matching should be done at once. This may be impossible later because of extensive hemolysis. Tests for the detection of hemolysis should be done about every three hours and transfusions given when indicated. Demerol is useful both for the relief of pain and for sedation. Antihistamines have a deleterious effect and should not be used.[11] Since the mouths of snakes have been shown to harbor both tetanus and gas-gangrene organisms, the use of specific antitoxins or tetanus toxoid is probably indicated. General supportive measures may include intravenous fluids to correct the dehydration which may occur as a result of persistent vomiting which frequently accompanies snake bites and the use of vasopressor agents such as Levophed to combat hypotension or shock. A combination of penicillin and a broad-spectrum antibiotic should be administered as prophylaxis against secondary infection. The usual precautions observed when administering any horse serum product should be kept in mind when antivenin is used.

Certain other methods of treatment which have long been accepted will be mentioned merely for the sake of completeness. Experimental and clinical evidence indicates that these methods are ineffective and even harmful at times. They include incision and suction, the use of a tourniquet and prolonged refrigeration of the involved part.

Human Bites

Human bites in adults are confined almost entirely to the hand and are usually the result of striking the teeth with great force while fighting. In contrast, bites in children may be inflicted almost anywhere on the body and are seen most often in the age group from two to five years. They probably represent one of the many ways by which a small child expresses aggression, but it is not the purpose of this discussion to go into the psychiatric aspects of the problem.

Human bites can result in severe infections and extensive damage to tissues because of the many dangerous organisms harbored in the mouth and the deep penetrating nature of the wound. Many methods of treatment are advocated, but all authorities are agreed upon one point—the wound should not be sutured, but should be left wide open. Thorough cleansing with pHisoHex or Septisol and water followed by débridement of all devitalized tissue will probably give best results. After this initial treatment wet dressings of saline solution or magnesium sulfate and splinting of the involved part are helpful. Penicillin should be given because of its bactericidal action on the organisms most liable to cause serious infection—the streptococcus and Vincent's bacillus. A broad-spectrum antibiotic may also be given if the physician feels that it is indicated. Tetanus toxoid or antitoxin should also be administered. Extensive wounds, especially around the face, may require plastic surgery after all danger of infection has passed.

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SKIN TESTING IN PEDIATRIC PRACTICE

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Skin testing has become an important and practical diagnostic procedure in pediatric practice. The physician must know the indications for each test. He must be able to interpret the tests properly and know their shortcomings and dangers.

One type of reaction which can be demonstrated by skin testing is that of immediate allergic hypersensitivity (Table 13). Such a reaction is clinically used and interpreted to indicate acquired sensitivity to inhalant allergens, biological preparations and chemicals. It may also be used in an effort to demonstrate sensitivity due to helminthic infestations. Such reactions are elicited by the scratch, intradermal and/or conjunctival tests. The specific test for each of these situations is beyond the scope of this paper. At present the immediate hypersensi-

TABLE 13. *Antigens for Immediate Type of Hypersensitivity Response*

TYPE SUBSTANCE	SOURCE OF TEST MATERIAL
Chemicals, biologicals, etc.	Specific preparation to be used
Inhalant allergens	Abbott Laboratories Endo Laboratories Hollister-Steir Laboratories Lederle Laboratories

tivity response has its largest application in attempts to identify offending allergens. The history is important when one is trying to decide which specific skin test to use in these cases. Using all the information which he can assemble, the physician can then attempt a program of desensitization or elimination, or both.

There are conflicting opinions about skin testing for hypersensitivity prior to the use of various chemical and biological preparations. They do not always foretell an anaphylactic response. This testing method is of no value, of course, in attempting to predict delayed reaction to the medicinal agent. Whether or not it is safe to use chemical and biological materials should be decided upon the basis of all the circumstances surrounding the individual case and not by the presence or absence of demonstrable hypersensitivity alone. When one decides to use such a test, the intradermal or conjunctival variety is usually performed.

Previous helminthic infestations are usually manifested by the production of an immediate type of hypersensitivity reaction to extracts of the parasite. This test is of limited practical value at present. Indeed, the antigens are not generally available.

Scratch tests are performed by scarification of the dermis with a sterile scratcher (e.g. needle, lancet) and application of a solution of the antigen to the scratch. Sensitive persons give a positive reaction within 30 minutes. Any degree of erythema or wheal formation is considered indicative of sensitivity. The degree of response varies directly with the skin hypersensitivity.

The *intradermal test* is performed by careful intradermal injection of the desired antigen, e.g. antimicrobial agents and horse serum products. Generally 0.1 cc. of a 1:1000 saline dilution of the test substance is injected and observed for 30 minutes for erythema or wheal, or both. As in the scratch test, any such reaction is considered positive, and the amount of reaction varies directly with skin hypersensitivity of the patient.

As mentioned above, the use of the *conjunctival test* corresponds to that of the intradermal test and is perhaps safer and even more sensitive. It is performed by instillation of one drop of a 1:10 saline dilution of the test material at the medial side of the palpebral fissure in one eye and one drop of the saline diluent in the opposite eye. It is best to put gentle pressure over the lacrimal duct during the test. Both eyes are observed for 10 to 30 minutes for tearing and irritation. Any reaction to the test material indicates sensitivity.

Unfortunately all three tests can be positive in persons who show no reaction to the material with normal use. Conversely, patients who have negative skin tests may have reactions.

The delayed type of hypersensitivity reactions, such as the tuberculin reaction, is more generally used to indicate allergy to bacterial, viral and fungal products (Table 14). A delayed hypersensitivity response suggests prior infection with specific microorganisms. Fortunately, the majority of antigens used for these tests are not themselves antigenic, so that repeated tests will not sensitize the patient. A specific exception is the nucleoprotein type of Brucella antigen. Reactions to most of the antigenic materials in use are highly specific, indicating prior infection with the organism. Skin test doses higher than those recommended will decrease this specificity. Infections with certain microorganisms can cause nonspecific reactions to various antigens used in testing. When this is suspected, one should test with antigens from both organisms. The larger reaction usually occurs with the antigen from the specific organism.

It is important to note that serial skin testing of positive reactors may reveal that there are some patients who revert to negative reactions. The endurance of delayed hypersensitivity varies with several factors: (1) intensity of exposure to the source of infection, (2) the number and virulence of the organisms, (3) the degree of response of the patient to the infection, (4) the frequency of re-exposure.

Contemporaneous tests performed with the same antigens in different anatomic locations will show a 90 per cent correlation. In other words,

one test will be negative while another test at another site will be positive in 10 out of 100 cases.

Classic delayed hypersensitivity is demonstrated by a positive reaction to tuberculin protein. A positive tuberculin reaction (greater than 5 mm. of induration) indicates prior infection with the tubercle bacillus. The activity of the infection must be determined by other means.

Recent evidence indicates that postprimary tuberculosis can be prevented by appropriate therapy of active primary tuberculosis. This makes tuberculin skin testing (5 tuberculin units) of previously negative unknown reactors mandatory. Such testing should be done at intervals of no more than six months. This permits appropriate therapy of converters. They should be tested yearly for possible reversions.

TABLE 14. *Antigens for Delayed Hypersensitivity*

INFECTION		ANTIGENS	SOURCE
Bacterial	Tuberculosis	PPD-S	Merck, Sharpe & Dohme; Parke, Davis; USPHS
	Unclassified mycobacterial infections (Battery and others)	PDD-B, etc.	USPHS
	Streptococcus	Dick (toxin)	Wyeth
	Diphtheria	Shick (toxin)	Cutter; Lilly; National; Parke, Davis; Wyeth
	Brucellosis	Brucellergen	Merck, Sharpe & Dohme
Fungus	Histoplasmosis	Histoplasmin	Parke, Davis; USPHS
	Coccidioidomycosis	Coccidioidin	Cutter
	Blastomycosis	Blastomycin	Parke, Davis
Viral	Mumps	Mumps antigen	Lilly
	Cat scratch	Cat-scratch antigen	None
	Lymphogranuloma venereum	Frei	Lederle
Helminthic	Trichinosis	Trichinella antigen	Lederle

Those who do not react to histoplasmin and coccidioidin in endemic areas should be tested contemporaneously with PPD-S in order to permit proper evaluation and therapy of symptoms. Those who react to the PPD-S deserve annual retesting with histoplasmin and/or coccidioidin to indicate converters. Agar gel diffusion tests and complement fixation tests made for serologic evidence of these infections can be influenced by earlier skin tests. Consequently blood for serologic studies should be drawn prior to the use of the histoplasmin and coccidioidin skin tests.

Skin testing with mumps antigen is indicated for adult males who have been exposed to mumps and are thought to be nonimmune. If the skin test is negative, the patient should be given hyperimmune gamma globulin in an effort to prevent orchitis.

Cat-scratch antigen is not commercially available. It is generally available only when made locally. Single test doses have been made available for selected cases by Worth B. Daniels, M.D., Washington, D.C.

Blastomycin, Brucellin and Frei tests are indicated when the specific disease is suspected, but they are not used as routine skin tests in pediatric practice.

The Schick and Dick tests deserve special mention. Specific toxins which are not antigens are used to elicit the delayed type of hypersensitivity response. A positive reaction to the specific toxin indicates that the person has not developed antibodies to diphtheria or to the erythrogenic toxin of the streptococcus. Development of immunity prevents local tissue reactions to the toxins, so that negative reactions suggest immunity.

Several practical rules can be applied to most skin tests and skin test materials:

1. Keep all antigens refrigerated unless directed otherwise by the manufacturer.
2. Check the duration of potency for each antigen in both the diluted and undiluted forms.
3. Check the manufacturer's instructions carefully for directions about dilution, injection and reading of results.
4. Record the site used for each antigen. Repeated injection of one antigen in a given site may (*a*) produce local antibody and decrease the expected response, (*b*) accelerate the expected reaction, (*c*) increase the intensity of a given reaction.
5. Use a tuberculin type of syringe for all skin testing.
6. Use a separate needle and syringe for each antigen.
7. Have syringes clearly identified and restricted for use with each specific antigen.
8. Use syringes and needles which have been sterilized in the autoclave in an effort to prevent serum hepatitis.
9. Record all results in measured linear units to permit common interpretation and accurate future comparative tests.
10. The measured hypersensitivity response to identical stimuli will vary between tests which are contemporaneously performed and those which are performed with an interval of time separating them.
11. Have a separate syringe filled with 1:1000 epinephrine before administering any test for immediate hypersensitivity.
12. Be prepared to administer positive pressure resuscitation when testing for immediate hypersensitivity.

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RESPIRATORY ALLERGY

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Because this article will attempt to present a practical approach to the pediatrician on the management of respiratory allergies as practiced in an allergy office, no attempt will be made to list references in the usual manner. The material presented is a composite of personal experience gleaned from many years of a restricted allergy practice plus knowledge gained from the literature and exchange of information with other allergists. The importance of the subject is emphasized by the fact that allergy is the third most frequent cause of chronic disease. In fact, it ranks first as a chronic ailment in children.

UPPER RESPIRATORY TRACT ALLERGY

Seasonal Allergic Rhinitis (Rose Fever, Hay Fever)

Allergic rhinitis occurs seasonally and perennially, or both. The highest incidence of seasonal allergic rhinitis is found in persons who are sensitive to grass and ragweed pollen. Grass pollen sensitivity has its peak in May and June and has the misnomer of "rose fever." Ragweed pollenates from mid-August to frost, usually reaches a peak during the first two weeks in September, and is misnamed "hay fever." From usage the terminology is interchangeable. Tree pollen is a less important cause of rhinitis, but the concomitant conjunctivitis has been named "vernal catarrh" because of its association with vegetation becoming green.

When symptoms are limited to a specific season, the *diagnosis* should be a relatively simple matter. Highly susceptible children will frequently have symptoms during the entire growing season or at times when grasses, ragweed and trees are not in heavy pollenation. These children will require allergy tests to determine the different exciting allergens such as English plantain, cocklebur, marsh elder and other pollens as contributing offenders. Because these patients usually are allergic to a number of allergens, it may be necessary to consider the neutralization of contributing inhalants such as mold spores, dust and animal danders. There may be sensitivity to one or more foods. These may be tolerated

ordinarily, but eating them during pollen seasonal episodes will aggravate symptoms. These foods must be sought in the history or by tests.

Seasonal allergic rhinitis is readily recognized by the layman and easily diagnosed by the physician. This does not decrease the importance of treatment, however, because untreated hay fever is often complicated by pollen asthma. About one in three hay fever sufferers has bronchial asthma. Other complications include sinusitis and nasal polyps. Latent atopic eczema is frequently exacerbated in susceptible children. Although seasonal allergies usually begin during or after the third year of life, they may appear earlier in a small percentage of allergic infants.

The best *treatment* for seasonal allergic rhinitis and all other allergic diseases is avoidance of the allergens. Pollenation occurs during the early morning hours, and precautions must be taken to prevent the pollen from entering the house, particularly the bedroom. There are numerous methods of protection and types of filters for this purpose. If nothing else, the bedroom window should be closed during the season. Because most homes have a window or exhaust fan, an efficient and inexpensive method of filtration is to place an electrostatic furnace filter in the window so that the fanned air passes through the filter. Electrostatic filters have been replacing the so-called mechanical filters and can serve a dual function in the furnace during the winter and in the bedroom window during the growing season. Window units such as an air conditioner or central units such as a Precipiton or furnace-attached electronic filter are desirable if they can be afforded.

Pollen allergies are usually most amenable to specific hyposensitization. Uniseasonal sensitivity can be determined from the history, and prepared extract for preseasonal treatment is available commercially. In the severe cases and especially for those with multiphasic sensitivities, it is preferable to use hyposensitization on a perennial basis. This method has the advantage of year-around protection by using a mixture extract which avoids the pitfall of preseasonal treatment such as frequent constitutional reactions and inadequate protection due to insufficient stimulation. Other than during the first year, the total number of injections required for protection is usually less than for preseasonal treatment.

It is a wise rule to have the child come indoors after 5 p.m., and the severe sufferer should retreat to his pollen-free bedroom for other activities. This added precaution is advisable because of the greater concentration of pollen at nose level in the late afternoon as a result of the cooling atmosphere, which causes the pollen to fall.

Antihistamines may prevent or reduce symptoms in the less severe hay fever patient. Fortunately, children tolerate these drugs with minimum side effects as compared to adults. The disadvantage of antihistamines, when this is the only treatment in the atopic child, is the development of tolerance to the drug plus failure to prevent other allergies such as bronchial asthma.

When conjunctivitis accompanies the rhinitis, it may be more dis-

tressing than the nasal symptoms. The corticosteroid ophthalmic preparations should be used with caution. Patients with less severe symptoms obtain relief from any number of proprietary eye drops such as Estivin, Visine and others, while the more severe cases require specific hyposensitization.

Perennial Allergic Rhinitis

This malady is often referred to as "year-round hay fever," and although the symptoms are similar to those of seasonal rhinitis, there are a few differences worth comment. In nonseasonal nasal allergy, symptoms generally tend to be less acute and more low-grade and chronic. Nasal stuffiness and blockage is most worrisome in perennial rhinitis, whereas sneezing and rhinorrhea are the most troublesome in seasonal rhinitis. Conjunctival symptoms are relatively uncommon in perennial allergic rhinitis in contrast to the severe conjunctivitis often seen in the spring and fall type of pollenosis. The appearance of the nasal mucosa in perennial rhinitis is usually pale and edematous with swelling of the turbinates in contrast to the fiery red mucosa with moderate swelling of the turbinates noted in hay fever. Eosinophilia is prominent in both types, but the discharge of perennial allergic rhinitis is more mucoid, whereas the discharge in seasonal rhinitis is usually more watery.

Perennial allergic rhinitis is caused by nonseasonal allergens such as dust, mold spores, danders, bacteria and foods in addition to pollens. Perennial symptoms frequently are the sequelae of hay fever and often develop for the first time and persist after frost, rather than abate. In the atopic child a history of preceding or concomitant eczema is noted, and when this is present, bronchial asthma may be the next allergic disease.

There are several manifestations which may be related to or simulate allergic rhinitis. These include recurrent upper respiratory tract infection, sinusitis and adenoiditis.

Recurrent Upper Respiratory Tract Infections

A common history and observation is the so-called recurrent upper respiratory tract infection, or RURI. Although considerable difference of opinion exists, it is my feeling that this entity is probably an allergy. It is not normal to have repeated colds a dozen times or more throughout the year. This is not to say that respiratory infection from bacterial or viral invasion plays no role in the etiology of these episodes. Nevertheless susceptibility to recurrent coryzal symptoms probably is on a hypersensitivity basis to microbial or contributory factors. Furthermore, the history and other studies will disclose the fact that these "colds" or respiratory symptoms are often triggered by exposure to allergens such as dusts of various sorts, animal danders, changes in weather, dampness or eating certain foods. Positive skin tests and the presence of eosinophils in the nasal secretions corroborate the existence of allergy.

Frequent common colds do develop in some children, allergic and nonallergic. But these are usually during the winter months when respiratory infections are prevalent. It is noteworthy that these colds or coryza symptoms persist for days or weeks longer in the allergic child than in the nonallergic one. The allergic child is prone to have more colds than the nonallergic child and has more complications such as bronchitis and sinusitis. There are two clinical criteria which help to distinguish the common cold from allergic rhinitis. One is the absence of fever, and the other is the absence of purulent discharge in uncomplicated allergic rhinitis. One or both of these findings are ordinarily present in respiratory infections. Polymorphonuclear cells and bacteria predominate in smears from nasal secretions from the nonallergic child in contrast to increased eosinophils in allergic rhinitis.

Allergic Rhinosinusitis

A common associate of allergic rhinitis is sinusitis. This is not surprising, considering that the accessory or paranasal sinuses immediately surround the nose, communicate directly with it through the sinus meatuses, and are lined by the same type of mucous membrane. The presence of sinusitis is often overlooked and frequently neglected. In addition to producing overt symptoms such as headache and postnasal discharge, it may act as a focus of infection. Normal ventilation of the accessory nasal sinuses is important and is dependent upon patent ostia. Enlarged, swollen and edematous turbinates with secondary inspissated mucus or mucopurulent plugs and crusts will interfere with the nasal and sinus airway. Superimposed infection readily develops in the sinus cavities, and in chronic cases it is not unusual to find polyps due to obstructed mucous glands.

In addition to correcting the pathologic state resulting from allergy, the use of antihistamines, decongestants such as ephedrine, and liquefying agents such as iodides may help control this problem. Nose drops should be used only temporarily when the eustachian orifice is blocked. Saline irrigations, two to three times a day, may promote the flow of mucoid or mucopurulent material from the sinuses. The use of specific antimicrobial agents when definite infection is present will augment resolution of the sinusitis. Irrigation of the involved sinuses by the rhinologist is of extreme value when the situation warrants. As a rule, surgical procedures are contraindicated or should be held to a minimum until nasal development ceases. However, when definite indications are present, such as obstruction from polyps, these should be removed.

Adenoid Considerations

In addition to chronic infection, enlarged adenoids frequently result from continuous irritation such as chronic postnasal discharge and mouth-breathing secondary to anterior nasal obstruction from allergy. From the airway standpoint, it will do no good to remove the ade-

noids so long as chronic obstruction is present in the nose. The exception to this is recurrent otitis media attributable to eustachian obstruction or the presence of infected, hypertrophied adenoids or pharyngeal lymphoid tissue. Recurrent otitis media should alert the pediatrician that the patient may have an allergy. The combination of enlarged adenoids and nasal blockage due to allergic rhinitis, unless corrected, will contribute to the development of the so-called adenoid or allergic facies. This consists of flattened malar prominence; a high, narrow palate (Gothic arch); malocclusion with overbite; sunken, dark periorbital fossae; and a nasal quality to the speech (rhinolalia). These children are listless and fatigue easily, probably because of poor ventilatory function. From a surgical viewpoint, as soon as an adequate nasal airway is established by allergy management, the adenoids should be removed with particular attention to the fossa of Rosenmüller.

Perennial allergic rhinitis can be a most stubborn illness and often resists treatment to the point of frustration for the allergist and despair of the parents. Usually the patient is oblivious of all of this and continues to sniffle and snort in his inimical manner to everyone's distraction. This is a real problem because it is a source of irritation to all within hearing distance. Because it receives so much attention, the child frequently uses it for this purpose. He should be taught how and when to blow his nose, and this should be insisted upon if the nasal passage is not completely obstructed.

Parents should be told that the treatment of perennial allergic rhinitis may be prolonged and seemingly unsuccessful except for the possible prevention of bronchial asthma and other complications. Nose drops are contraindicated because they ultimately lead to a rebound phenomenon, but are of value when used temporarily if otitis media threatens or is present. Every attempt should be made to find one or two antihistamines which will relieve symptoms. Different chemical groups of antihistamine should be tried until the one or two which offer the most relief are determined. Alternating the two or more effective antihistamines helps to prevent the development of tolerance. It is worth remembering that children often have less side effect from relatively large doses of antihistamines than do adults and adolescents. They may require these larger doses.

Another observation about antihistamines is that a tablet or capsule seems to be more effective than an elixir or syrup and should be given as soon as the child can learn to swallow a pill. Theoretically at least, time-released tablets offer prolonged relief. There is some question, however, as to whether the several layers are utilized, since the tablets may traverse the small bowel before complete disintegration. It is wiser to use an uncoated, scored tablet even though it may have to be administered more often. For some children a half of a tablet offers as much relief as a whole one, and this dose should be tried first. This helps to reduce the development of tolerance, and as the child grows older and heavier the total tablet dosage will still be effective.

House dust and respiratory infection are two important factors in the cause and aggravation of perennial allergic rhinitis. Infection should be prevented whenever possible, and dust must be combated assiduously. A dust-free, pollen-free bedroom is essential because freedom of exposure enhances the loss of allergic sensitivity.

Respiratory vaccines are of value in a fair proportion of patients, though stock respiratory vaccines probably are not as specific as autogenous vaccines. Although some proprietary vaccines have received more favorable comment than others, the beneficial effect probably is more fortuitous than specific. I have found it advantageous on occasion to combine two or more different stock vaccines. An attempt should be made to administer the most concentrated dose the patient can tolerate, and this should be repeated as necessary to stimulate immunity. Adenovirus vaccine does not appear to offer the same protection for children as it does for adults; nevertheless it should be tried for the infection-prone infant or child. Influenza vaccine may impart specific as well as nonspecific immunity in some patients. A dose of 0.05 to 0.10 cc. given intradermally on 2 successive weeks in midfall, then repeated in midwinter, apparently imparts adequate protection.

If agammaglobulinemia or hypogammaglobulinemia is present or suspected, 0.02 cc. of gamma globulin per pound of body weight given every 3 weeks may prevent respiratory infection. Streptococcus-susceptible persons should be given prolonged courses of penicillin or sulfonamide prophylaxis, particularly if asthmatic episodes are triggered in addition to aggravating the rhinitis. The respiratory infection-prone, allergic child should not be unnecessarily exposed to people with colds or to factors which contribute to development of the common cold.

Foods should never be overlooked as a possible source of trouble. If a trial-elimination-provocative diet based upon skin tests fails to elicit any offender, other types of elimination diets should be tried. Foods which are eaten excessively or to the exclusion of a more varied diet should be suspected and removed for at least two to three weeks to see whether any decrease in symptoms occurs. Even if improvement is not readily discernible during this abstinence period, the symptoms will be reproduced or increased when the suspected food is reintroduced if the patient is actually allergic to it.

If the patient does not obtain sufficient or prolonged relief from the foregoing suggestions, an allergy consultation is warranted.

LOWER RESPIRATORY TRACT ALLERGY (BRONCHIAL ASTHMA)

There is considerable difference of opinion as to what constitutes allergic bronchitis, asthmatic bronchitis and bronchial asthma. Further definition is required, but for the purpose of this discussion I shall assume an arbitrary position by the following statement. When the triad symptomatology of cough, wheeze and dyspnea occurs more or less concurrently in the same person with a personal or family history of allergy, the condition should be considered bronchial asthma until proved otherwise. This does not imply that cough, wheeze and dyspnea cannot result from other situations, disease, infection or foreign body.

Bronchial asthma often manifests itself differently from attack to attack and from person to person. Attacks can run the gamut of those which only occur sporadically but may be severe enough to terminate fatally, to the continuous, smoldering, perennial form. Other conditions which simulate bronchial asthma must be differentiated when a patient is seen with the triad of symptoms described.

If bronchial asthma is the final diagnosis, it should be recognized and treated as such. There is no valid reason for disguising the diagnosis under a different name in order not to upset the parents, nor should a passive attitude be adopted in reassuring them that their child will outgrow his allergy. The fact that a child has bronchial asthma does not indicate that he is doomed, but when attacks continue to recur, the pediatrician should not assume the position of an ostrich and hope that the predicament will vanish because he refuses to recognize it. Bronchial asthma is a serious disease, and serious efforts should be made to control or eradicate it.

To ignore the consequences of untreated bronchial asthma by hoping that it will ultimately disappear spontaneously is sheer neglect. Even should the patient be fortunate enough eventually to lose his allergy, this may not occur for many years, during which time the child will continue to suffer. Should he not lose this tendency, the future may prove to be a dim one. Indeed, he frequently becomes a pulmonary cripple.

Diagnosis. As a rule the diagnosis of bronchial asthma is not difficult and can often be made clinically from the history. Observation and examination of the patient during an attack with dyspnea and other findings of obstructive emphysema, such as audible wheezing or musical rales heard throughout both lungs, with or without prolonged expiration, practically clinches the diagnosis. A cough may or may not be present. Dramatic relief with epinephrine or other sympathomimetic medication helps to corroborate the diagnosis.

Treatment. The three most common asthmatic attack patterns are (1) acute bronchial asthma, (2) subacute, recurrent or chronic asthma, (3) status asthmaticus. Treatment will be discussed according to the nature of the attack, but will be limited to the first two types for this article.

Acute Bronchial Asthma

This is a frightening experience for the patient and the parents, particularly the first few attacks and especially if the episodes are moderately severe. This is mentioned to emphasize the importance of the physician's attitude in these situations because it reflects his understanding of people and of bronchial asthma. He must have knowledge and confidence in what he is doing in these circumstances, and this confidence will reassure the parents immediately and allay the fears of the child who thinks he is about to suffocate.

Etiology. Each acute attack must be evaluated as to precipitating and aggravating factors. It is not enough to administer an injection of epinephrine, penicillin or ACTH and then dismiss the patient as

soon as the paroxysm temporarily subsides or ceases. A distinct effort should always be made to determine the underlying cause of the attack, since it may recur or persist unless the factors which initiated the episode are removed. It is essential to obtain a thorough history and examination at the first attack. Special laboratory tests, including chest x-ray if indicated, should be done. Certain information is helpful in the history, and inquiry should be made about anything new or different in the patient's environment. This includes pets, clothing, stuffed toys, and furniture. Activities such as playing outdoors, a ride in the country or a visit to a farm or circus are suspect. Changes in the diet, including any new addition or excess, should be questioned. Inquiry about furnace heat, musty closets or damp basements should be made. Other common aggravators include sudden changes in temperature and weather, emotional swings, overexertion and fatigue.

Whenever any triggering agent or factor can be pinpointed, it must be avoided or removed. One of the most frequently suspected causes of an acute asthmatic attack is an upper respiratory tract infection. Note that the word "suspected" is used, since the allergy actually may precede the infection rather than the infection precede the asthmatic attack. Irrespective of this moot point, whenever a respiratory infection is present, it should be treated with the most appropriate antimicrobial agent. The sulfonamides can be given a trial, and if the infection is not coming under control within 48 hours, one of the "mycins" can be substituted or added. Penicillin should be used with caution and only when specifically indicated. For those children who have repeated upper respiratory tract infections, much time and money can be saved by obtaining a nasopharyngeal culture to determine bacterial sensitivity. This is more logical than prescribing one expensive antibiotic after another, hoping to hit upon the one which is effective, but in the meantime allowing the bacteria to develop antibiotic resistance.

There are two fairly reliable criteria which help to distinguish allergy from infection. In infection the secretions become purulent, and fever with malaise is usually noted. When all these symptoms are present, the diagnosis is relatively simple. A smear of the nasal secretions may help to establish which condition predominates. This has been discussed under Recurrent Upper Respiratory Tract Infections.

MEDICATION. The most effective, fastest and most dependable medication for relief of the average acute attack of bronchial asthma is a subcutaneous injection of 1:1000 solution of aqueous epinephrine. The amount given should be based upon the age and weight of the patient and the severity of the attack. It is seldom necessary to administer more than 0.25 cc. even to the large child. When necessary, the dose can be repeated in about 15 minutes. If the attack persists after two or three such injections, a different medication should be considered. Before discussing other measures, it should be pointed out that as a rule, large amounts of epinephrine do no more to stop an asthmatic attack than smaller, appropriate doses. Furthermore, small dosage has the added advantage of permitting repetition if necessary without causing extreme palpitation and severe tremor. The lesser

dosage method frequently prevents the secondary vascular phenomenon which produces the shocklike appearance and vomiting often seen in children from an excessive dose of epinephrine. It also helps to avoid the development of epinephrine-fastness. A rough guide for dosage would be as follows: under one year of age—0.05 to 0.10 ml.; one to 3 years—0.10 to 0.15 ml.; 3 to 6 years—0.15 to 0.20 ml.; and 6 years or older—0.20 to 0.25 ml. Ephedrine sulfate, which is available in ampules as ⅜ grain (25 mg.) per milliliter for parenteral administration, will relieve bronchial asthma, but it acts more slowly than epinephrine. Some asthmatic children obtain relief with an antihistamine, but ordinarily this is not too dependable.

Because each of these three medications, i.e. epinephrine, ephedrine and antihistamine, exerts its favorable effect somewhat differently, I combine them in a single injection which enhances their separate and total beneficial effect. Thus epinephrine offers immediate relief, ephedrine supplies prolonged action; and antihistamines help to counteract the jitteriness due to the other two preparations as well as lessening the tendency toward epinephrine-fastness. I refer to this mixture as the asthma "cocktail." The individual amount of each ingredient can be adjusted to meet the situation. A specially prepared vial of ephedrine sulfate is made so that 1 ml. equals 1 grain (60 mg.), and the cocktail is usually mixed in a 1:1.5:2 proportion, e.g. 0.10 ml. of epinephrine, 0.15 ml. of ephedrine and 0.20 ml. of antihistamine. Ordinarily one injection of this asthma cocktail will abort most acute attacks of asthma, but occasionally it has to be repeated after 15 to 20 minutes. If two injections fail to stop the attack, a change in medication will be necessary. When aqueous epinephrine or the cocktail successfully relieves the patient, this can be followed by longer-acting epinephrine-in-oil, given intramuscularly in 0.25- to 0.50-ml. dosage for a child. This usually provides 12 to 24 hours of relief until other measures to counteract the precipitating factors become effective.

Aminophylline (theophylline-ethylenediamine) in one form or another is utilized whenever epinephrine fails. It is most efficacious when administered intravenously. Aminophylline is readily absorbed through the large bowel. Although this is second best to the intravenous route, it will provide considerable relief. Several proprietary rectal suppositories with or without phenobarbital, including combinations such as Tedral, Aminet and others, can be used. Numerous oral preparations of aminophylline and theophylline separately or in combination with sedatives and ephedrine in an elixir, tablet or capsule are available, but these act somewhat slowly. Furthermore, some children vomit from aminophylline or exhibit shocklike symptoms.

The acute attack of bronchial asthma can result in dehydration and acidosis if not counteracted by appropriate treatment. Furthermore, the sympathomimetic preparations utilize available glucose or glycogen stores, which must be replenished. This should be impressed upon the parents to encourage the child to drink more than average quantities of liquids, particularly those high in carbohydrates, during an asthmatic episode. Fruit juices, soft drinks and hard candy such as lollipops supply needed carbohydrate as well as stimulating a desire

to drink more fluids. If immoderate vomiting develops from excessive mucus or excessive medication, fluids can be replaced rectally. An enema containing a tablespoonful of sugar with a teaspoonful of sodium bicarbonate to a pint of water will help combat the dehydration, the hypoglycemia and the acidosis. Parents should be advised that the best indication of sufficient fluid intake is frequent urination. Unless vomiting becomes excessive, it may be advantageous because this helps rid the bronchial tree of obstructing mucus and diminishes the development of acidosis through the loss of chloride. If vomiting persists, however, it must be controlled by antiemetic medication; otherwise parenteral fluids will be necessary.

Apropos of the significance of bronchial lavage is the cough reflex. As long as the cough reflex is active during an asthmatic attack, the danger of obstruction from mucus is considerably reduced. Crying accomplishes the same purpose in the infant. The importance of the cough in bronchial asthma is often overlooked. In fact, this symptom never should be absolutely suppressed, nor should it be permitted to exhaust the patient. A delicate balance must be maintained between these two extremes, and a mixture such as the following has been helpful under these circumstances:

℞

Syrup ephedrine	30.0
Syrup Mercodol	30.0
Syrup Orthoxicol	30.0
Hydryllin Compound	30.0

Sig: Teaspoonful every 3 to 4 hours for severe cough.

Whenever the cough becomes so intractable that it saps the patient's energy, dihydrocodienone in proper dosage may be added to this mixture to attenuate the cough.

If the cough reflex is absent or the cough nonproductive, the situation is more serious. It is imperative that the bronchial tree be emptied and kept free of excessive mucus. Until the patient can cough productively or spontaneously, it will be necessary to clear the clogged bronchi by other means. From my standpoint, although it is somewhat controversial, the use of ipecac syrup will produce bronchial lavage. It can be used effectively without causing too much emesis by combining it with an equal amount of a mucolytic agent such as aqueous solution of potassium iodide.

Other mucolytic agents and expectorants in addition to iodides include syrup of hydriotic acid, guiacol and ammonium chloride. Personally, the saturated solution of potassium iodide (SSKI) appears to be the most efficacious of all, and I prescribe one to 2 drops per year of age at least 4 times daily during an acute phase of bronchial asthma. This usually liquefies the mucus sufficiently to be physiologically amenable to ciliary action, and if adequate hydration is maintained, this will aid in the liquefaction of the inspissated mucoid material. These two factors will assist in dislodging mucus plugs from the bronchi.

SEDATION. Sufficient rest and sleep are necessary for the patient and his parents. As a rule, the infant or child with bronchial asthma will

intermittently doze or sleep during a prolonged asthmatic episode, but the mother will not. Because asthma occurs more often at night and usually appears to be worse during these hours, it does not require more than a few nights of this before the entire family becomes weary and irritable. The barbiturates and chloral hydrate are relatively safe soporific agents to use in asthma and can be administered separately or in combination with other medications such as aminophylline-phenobarbital suppository. Elixophyllin, which is aminophylline in an alcohol base, has a sedative effect in some children. If the attack can be reduced in severity or stopped even temporarily, the exhausted child will fall asleep without sedation.

Often an acute attack of asthma can be aborted or modified by one of the oral proprietary drugs. Most of these are combinations of aminophylline (for bronchospasm), ephedrine (for edema) and phenobarbital (for sedation). Some of these preparations include potassium iodide for an expectorant. Norepinephrine may stop a sudden attack when used sublingually, and it is available in several preparations as a glosset. It is worth remembering that a particular mixture will relieve one patient and not another. Therefore different preparations should be tried until the most efficacious one for the patient is determined.

Subacute, Recurring and Chronic Bronchial Asthma

Whenever a child or infant has attacks of bronchial asthma which recur periodically and perennially, with or without seasonal exacerbations, he usually will not "outgrow" his asthmatic tendency without some help or by chance. Nor is a change in climate necessarily the answer to this problem. These statements are made with bias, but not without good intention. If there is a strong family history of allergy and if the patient's asthma has been preceded or accompanied by atopic eczema or allergic rhinitis, he is headed toward a long course of allergic difficulties unless measures are taken to avert this. The sooner the pediatrician recognizes this fact and places the patient on a dynamic program aimed at reducing the allergic diathesis, the better will the patient fare over the long haul. This does not necessarily imply that every asthmatic child should be referred to an allergist. But every pediatrician should inform himself in the fundamentals of allergy, at least enough to know that waiting will not resolve chronic or recurrent bronchial asthma in most instances. There is no valid excuse for not outlining and insisting upon a definite program for the asthmatic child. Should this program prove inadequate after a reasonable trial period, allergy testing and specific hyposensitization can then be instituted. Although not curative, this will arrest or lessen the severity of the disease in about 75 per cent or more of children with bronchial asthma.

Environment. Much of what has been said about treatment of acute asthmatic episodes is applicable to recurrent asthmatic attacks. Symptomatic medication will be required more regularly, however; environment control should be more thorough and consistent; and other matters will require closer supervision. Perhaps the most im-

portant of all these is environmental control. The significance of this element is immunologic and lies in the fact that if the allergic person never was exposed to allergenic substances, he possibly would not have clinical manifestations. One definition of allergy is "an over-reaction to a normal stimulus"; obviously, then, the less exposure to allergens, the less symptoms will result. Because it is humanly impossible to totally shelter the patient against allergenic substances for 24 hours, day in and day out, season in and season out, the logical approach to the probem is to concentrate on one area. The most practical area is the bedroom, which is chosen for several reasons:

1. The patient spends approximately one-third of his life in his bedroom.
2. Bedrooms usually contain many highly allergenic materials.
3. Pollenation occurs during the hours most people are in their bedroom.
4. This room can be modified to meet allergy-free requirements without disturbing the remainder of the household.

Although it is of secondary importance, the cost of converting the bedroom into an allergy-free area is a worth-while medical expense. Perhaps the most common cause of poor results from allergic management is failure in the observance of environmental control.

The atmosphere about the home should be one that is free of tension and excitement. The patient should have adequate rest and sleep and not be subjected to repeated emotional turmoil. Undue exertion which causes symptoms should be curtailed. Visiting other homes or attending events which usually result in an attack of asthma should be reduced to a minimum or entirely forbidden. All this can be summed up by stating that any activity or exposure which invariably results in an asthmatic episode is taboo. Ordinarily these will be limited to a few and should not work a hardship on anyone. Perhaps the most arbitrary question is what should be done about the household pet dog, cat or bird. The majority of allergists advise against pets because of potential sensitization if not already present. I think the wisest approach, particularly if it will create an emotional crisis, is to not remove the pet animal or bird until a satisfactory substitute can be made such as gold fish for the bird and permit a cat or dog, provided they are kept outdoors. If this is unacceptable, then the only recourse is to point out the choice of keeping the pet or the asthma. Hyposensitization to the particular dander is not the proper solution of this problem.

PREPARATION AND MAINTENANCE OF AN ALLERGY-FREE ENVIRONMENT

The instructions outlined below may seem unnecessarily severe, but experience has shown that a dust-, pollen- or mold-free environment for even a part of a 24-hour period will substantially benefit the allergic patient. It is impossible to continuously control dust and other allergenic factors throughout the home, school or elsewhere, but the bedroom does require rigid control.

The infiltration of dusts, pollens, molds and other allergens into a bedroom is insidious and cannot be controlled by ordinary housecleaning methods. Dust filters through the windows and spaces around the frames. Old dust, which is the most

allergenic, comes from other rooms in the house, and most heating systems are dust circulators.

Pillows, mattresses, box springs, bed pads, blankets, bed spreads, comforters, quilts, stuffed furniture, rugs, drapes, clothing and other materials from organic sources present in the home deteriorate to produce lint and dust which is highly allergenic.

The following fundamentals are suggested as an aid in avoiding house dust, feathers, molds and other allergens commonly found in the home. It is ESSENTIAL that the rules applying to the bedroom be followed closely. In other rooms these recommendations should be observed as much as possible. Rubber foam should be used wherever possible.

Bedroom

1. Mattresses and pillows should be of foam rubber or encased with impervious rubber or plastic) covers, closed with a zipper.

Open springs, washed frequently, are preferable to innersprings, which also should be encased.

These rules apply to all beds in the patient's bedroom.

2. No filled quilts or comforters are permitted; use only blankets with blanket covers. Blanket covers which are washable can be made or purchased. Electric sheets are permissible.

3. The floor should be bare or covered with linoleum, unless otherwise instructed. Cotton wash rugs may be used if absolutely necessary, but they should be laundered at least weekly.

Use no wool rugs or carpets.

4. When curtains are used, they must be laundered at least every 2 weeks.

5. Clean the floor daily. No sweeping or dry dusting is permitted. All dusting should be done with a vacuum cleaner or a damp mop. Walls should be kept dust-free.

6. Clean frequently behind pictures and have as few as possible.

7. No smoking in the bedroom.

8. Keep furnace registers closed or use filters.

9. Avoid stuffed animals. One plastic-covered or rubber animal or doll is permitted.

10. No upholstered furniture in the bedroom. Chairs should be plain or covered with leather or plastic and padded with foam rubber.

11. Books should not be kept in the bedroom.

12. Do not use insecticides in the bedroom or closet.

13. Keep the bedroom windows closed all the time unless a window filter or air conditioner is used. Flowers or plants should never be in the bedroom.

14. All clothing in the bedroom and closets should be enclosed in plastic bags whenever possible, and keep closet doors closed.

Other Rooms

1. Use as little carpeting as practical. Rubber padding should be used under carpeting.

2. Use drapes and venetian blinds as little as possible.

3. A good vacuum cleaner with attachments is essential and should be used frequently.

4. If one is in contact with animals (riding horses or working with farm animals), change clothes before entering the bedroom.

5. Keep all pets out of the house (especially cats, birds and dogs), even if skin tests are negative—*never* allow animals in the bedroom.

6. "Close up" bottoms of upholstered furniture with plastic or a similar material.

7. No extra or decorative pillows are permitted unless they are encased or made of nonallergenic material.

8. General rules listed for the bedroom should be applied to all other rooms whenever possible.

Heating

1. Radiant heat probably is best for allergy sufferers, hot water or steam next, and hot air least.
2. If a forced air furnace is used, filters must be replaced frequently or kept clean at all times regardless of type used. Permanent (electrostatic) filters are satisfactory.
3. Before the heat is first turned on each fall, clean the radiators or registers and hot air ducts thoroughly.
4. After the heat is turned on, use register filters, dampened cheesecloth or steel wool filters.
5. Avoid drafts.

Air Conditioning or Circulating Air Filters

1. These are especially beneficial to pollen- and mold-sensitive patients and should be used whenever possible. Electrostatic furnace filters placed in the window with a fan may be helpful.
2. Avoid extreme temperature changes, particularly if they aggravate the allergy. Maximum temperature changes from one room to another should not exceed 10 degrees at any time.

Mold (Mildew) Instructions

1. Good ventilation, light, dryness and cleanliness are necessary to prevent mold growth. An electric fan should be used in the doorway of an area where there is excessive humidity.
2. An electric dehumidifyer is an excellent means for removing moisture from the air.
3. Silica-gel, activated alumina and calcium chloride, all sold under various trade names, help to control mold growth by absorbing moisture from the air. (DeMoist is available in 50-ounce bags for a room and 8-ounce bags in closets.) Calcium chloride is good, but it tends to drip water and may damage clothing if it comes in contact with it.
4. A small electric light should be kept lighted in any closet, basement or room where mold or mustiness is present.
5. Paradichlorbenzine (PDB), which is commonly used for moth control, will control the growth of molds. Scatter the crystals in moldy places if the odor does not aggravate the allergy.
6. "Hyagen" (Miami Products and Chemical Company, 520 Lonoke, Dayton 3, Ohio) can be used to paint the walls for mold control.

Odors and Fumes

1. It is best to remove the patient from the house during any extensive painting, moving or decorating, and long enough thereafter until paint odor disappears.
2. Patients should never do any house painting themselves, especially indoors. Under no circumstances should a patient ever paint in an enclosed space such as a closet.
3. Keep cosmetics and highly scented material out of the bedroom.

DIET. The diet can play a significant role in the production of bronchial asthma. Possible food offenders should always be suspected, sought for and eliminated when found. This is not easy, but it is worth doing. Keeping a food diary for a month or longer and noting any exacerbations in symptoms will frequently pinpoint specific aggravators.

In my experience, usually not more than two or three foods are found which produce symptoms, but if the patient continues to eat these foods, they will keep the asthma smoldering. The most common offenders are milk, wheat, eggs, nuts, chocolate, spices, corn, cottonseed, fish, peanut butter and cod liver oil. These should be removed from the diet for several weeks, then reintroduced one at a time in more than average quantity for a day or two and observe for any increase in symptoms. If the same food invariably reproduces symptoms, it must be removed from the diet for several months and then re-tried when the patient is clear of symptoms.

INFECTIONS. Although it sounds trite, good general health should be maintained. It is not uncommon to note a loss of several pounds with each acute attack of asthma, or to observe retardation in growth and development in chronic asthma. Under the heading of general health, the argument for or against adenotonsillectomy usually requires some discussion (see also p. 105). My belief is that the indications for this procedure are practically identical for the allergic and nonallergic child, with two notable exceptions. First, it is advisable for the allergy to be stabilized or controlled by allergic management, including hyposensitization, before the operation is contemplated; second, the avoidance of elective surgery during the growing season, especially in pollen-sensitive persons.

Other foci of infection must not be neglected, particularly the accessory nasal sinuses and root abscesses. Root abscesses are not too common in the pediatric asthmatic, but when they are present, indicated dental treatment is necessary. Chronic paranasal sinus infection in children is frequently neglected because it usually does not produce the classic symptoms of sinusitis seen in adults. Nevertheless it is a relatively common finding in the allergic child if one looks for it, and it contributes to the persistence of asthma as well as other symptomatology such as chronic postnasal discharge, rhinitis and sinobronchial disease. In older children sinus irrigations are usually beneficial, and a prolonged course of the appropriate antimicrobial agent will alleviate the sinusitis. If bronchiectasis is present, surgical intervention and antibiotic therapy should not be delayed or shrugged off by suggesting a change in climate. Not everyone can move to a warm, dry climate; furthermore, there is no longer need for this with available expert chest surgery and knowledge of microbiology. Polypoid degeneration or polyps are not uncommon in many patients with allergic rhinitis, sinusitis and bronchial asthma. Polyps can act as a focus of infection as well as cause mechanical obstruction to the nasal and sinusal airway. When a polyp becomes pedunculated, it usually will not disappear spontaneously or with corticosteroid therapy. Extirpation should be complete and repeated whenever necessary to maintain proper airway, but without undue radical surgery which may interfere with normal nasal development. Response to allergic management will retard or forestall the recurrence of polypoid degeneration.

Chronic or frequently recurring respiratory infection must be controlled and prevented if possible. Reference has been made to the

value of determining the appropriate antimicrobial drug for the specific infection, including the use of vaccines prophylactically. Whenever necessary, the antibiotic should be administered for weeks or months until every vestige of the infection has been eradicated. Periodic evaluation for blood dyscrasia should be made, but fortunately this complication is not too common in children with chronic bronchial asthma. Occasionally gamma globulin is seemingly effective in preventing recurrent infections. Finally, the so-called Ping-pong source of infection should be borne in mind and corrected if present. This is the situation in which another member of the family harbors the infection which is passed back and forth between this person and the patient. Therefore the carrier must be treated along with the patient.

MEDICATION. Regular use of symptomatic medication may prevent the frequency and severity of asthmatic attacks even though it does not eliminate the root of the disease. Medications without too much ephedrine or which substitute the racemic form (racephedrine) are less stimulating. Aminophylline or theophylline combined with ephedrine and one of the barbiturates generally is the most effective in the prevention of edema, bronchospasm and congestion. Antihistamines have been added to a few preparations for pollen-sensitive patients. This has been discussed more fully elsewhere. The continuous use of iodides, which evidently have a beneficial effect in addition to the liquefaction of mucus, has in my opinion been of inestimable value in the subacute and chronic asthmatic sufferer. Its mode of action is not completely understood, but there is some conjecture that perhaps the adrenal cortex is stimulated in some manner. I prefer the saturated solution of potassium iodide (SSKI), not only because it appears to be the most effective, but also because it is the least expensive of all medications used in the treatment of bronchial asthma—next to water.

PSYCHOGENIC FACTORS. For the sake of completeness two other aspects in the management of bronchial asthma require discussion. The first of these is the role of psychogenic factors. It is not the purpose of this paper to go into detail about this facet of allergy anymore than to discuss the allergy testing and specific treatment. Without any intention to be dogmatic about this moot point, I wish to state that in my opinion only a small percentage of bronchial asthma is psychogenic in etiology, but a high percentage of asthmatic sufferers are affected by emotional and tension factors. In those situations in which the psychogenic factors predominate over the allergic picture, definite measures should be initiated such as child guidance, psychiatric care or referral of the child to an institution which specializes in such problems in allergic children.

STEROID THERAPY. The second controversial subject is frequent or regular use of cortisteroids or corticotropic hormones. The last word on these powerful biologic agents has not been said. They are being prescribed, however, with too little discretion. In chronic or recurrent bronchial asthma corticosteroids or corticotropins should not be given unless all accepted and orthodox methods of allergy treatment have been fairly tried. For the occasional, severely acute asthmatic episode

or in status asthmaticus there may be a definite temporary need for these hormones, but they should be discontinued as soon as possible.

SUMMARY

Throughout the discusion there has been a deliberate attempt to refrain as much as possible from alluding to the role of the allergist in the management of respiratory allergies. I do wish to make perfectly clear, however, that should the suggestions and advice given fail to control or resolve the disease, there should be no hesitancy in consulting the allergist. It may be that he will not achieve 100 per cent results, but there is no doubt about the efficacy of allergy management, including specific hyposensitization in the majority of allergic children. Although the effort may be considerable for everyone concerned, the results are worth it.

Before concluding, I wish to mention that no discourse about status asthmaticus was entered into except briefly in a preceding paragraph. This situation definitely does not come under the category of home or office treatment, and so it was omitted.

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INFANTILE ECZEMA

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Atopic dermatitis is a term used to include conditions described as infantile eczema, neurodermatitis, allergic eczema and plain eczema in children. These children have a strong hereditary disposition for the affliction. It is characterized by intense itching and a progression of skin changes such as papulation, vesiculation followed by weeping, sometimes becoming infected with pustulation and crusting. There is lichenification in the chronic states.

DIAGNOSIS

There are three types of atopic dermatitis: (1) the acute form, including atopic erythroderma (described by Hill), (2) the chronic form, and (3) atopic dermatitis from contact.

Atopic dermatitis is found in the child who has the same abnormal constitution as that which is associated with hay fever and asthma. In fact, these conditions may all be found in the same child at the same time. About 50 per cent of those who have infantile eczema have some form of respiratory allergy later in life. It is the most common form of chronic skin disorder found in early childhood and may last throughout childhood and into adult life. Hill has said that it is as much a constitutional disease as diabetes or leukemia.

The disease manifests itself differently in infants under the age of two years than it does in older children and seems to be induced by different stimulants. In infants the lesions tend to be more generalized, while in the child past two they become more limited, occurring more often on the face, neck, antecubital and popliteal regions, and around the wrists and ankles. Foods play a prominent role in infants. They play only a secondary part in older children, and the environmental conditions seem to take over the major role as the etiologic stimulants. In some cases neither seems to be the answer, but rather some "X factor" as yet unknown.

With these preliminary data in mind, when a dermatitis patient is presented to us for care, we first try to arrive at an accurate diagnosis.

A careful history is taken with an attempt to find a familial tendency to allergic diseases such as hay fever, asthma, allergic sinus disease, atopic dermatitis, gastrointestinal allergy and migraine within the closely related members of the family. If such familial tendencies are found, they help to substantiate the diagnosis of atopic dermatitis. Other sensitizations in the patient may be uncovered by inquiring about early feeding reactions such as vomiting, crying, diarrhea, as well as searching for contactants within the environment which might be causing disturbances. There may be no such related atopic diseases found in some cases of atopic dermatitis, and the diagnosis must be based upon the clinical findings.

The clinical findings, as already mentioned, include widespread lesions in the child under two years of age and more limited areas of involvement in older children (face, neck, antecubital and popliteal spaces, wrists and ankles). The lesions are characterized by the progression show in Figure 35.

Itching is always present, becoming worse at times. There may be skin destruction from scratching. Itching may be so intense that re-

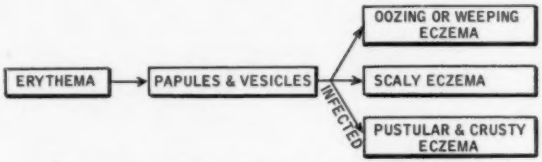

Fig. 35. Progression of lesions in infantile eczema.

straints must be used. Pruritus and edema are the cardinal features found in atopic eczema. All stages of the condition may be found together in the same lesion. Sometimes it is difficult to be sure of the diagnosis. We immediately ask for dermatologic help when this is the case.

Laboratory examinations will show increased eosinophils in the peripheral blood in a large percentage of these patients. Their absence does not rule it out, however.

TREATMENT

Once the diagnosis is established, the problem is attacked differently in children under two years of age than it is in older children. In those children under two years of age we see whether the lesions are widespread or more or less limited. If they are widespread, we feel that food probably plays a more important role, particularly in the early months when milk has been the basic food. It is worth while to eliminate milk from the diet and substitute a nonallergic preparation such as Soy-lac, Sobee, Mull-Soy, Nutramigen or meat base formula.

In the child from 12 months to 2 years of age it may be more difficult to establish food as a cause. If the lesions are primarily on the

exposed surfaces, one suspects the environment. Its control then plays a more important role in the treatment. The environment should be cleared as much as possible of feathers, wool, danders and house dust. Long cotton stockings and long-sleeved clothes are recommended. It is rarely necessary to skin test this age group, since the environment and food are so limited that elimination tests usually produce good results.

In the older child the cause will be more difficult to find, and one is justified in doing an allergy survey if continued success is not readily obtained by simple ointments applied by the mother in conjunction with reasonable environmental control. If there is any infection in the area, this must be cured before any hope of improvement in the primary lesions can be expected. This is done by soaking the lesions with Burow's solution (1 ounce to 8 ounces of water) or potassium permanganate compresses (5 grains to 1 gallon of water makes a 1:12,000 solution). Antibiotic salves such as Aureomycin Ointment (Lederle), bacitracin ointment (Upjohn) or many others may be used with success.

Allergic Factors

If these simpler methods do not control the lesions, we do a complete allergy survey, including a detailed inquiry about the entire house and environs, an estimate of the influence of psychological factors and complete skin testing. If significant findings are obtained, allergy control is attempted and hyposensitization procedures are performed while, at the same time, the patient is given adequate local dermatologic care. It is our policy to confer with a dermatologist in conjunction with our control in all the more difficult cases. This approach produces more satisfactory results.

Children with this type of eczema should be referred to a pediatric allergist and a dermatologist unless one is adequately experienced in allergy. The allergy phase of treatment is handled in our office, and the dermatologist is asked to support us with the skin care.

In the milder cases the patient is put on a simple but well balanced diet, leaving out the most common offenders (milk, eggs, wheat) and gradually adding new unoffending foods. Eliminate all pets and birds from the house. Cover the mattress with nonallergenic encasings and change from feather to either foam rubber or Dacron pillows. Substitute synthetic blankets for wool ones, and clean up the sleeping room so that a minimum of house dust will be present. This entails taking out rugs and felt pads, putting all toys in a box with a lid, using closets only for current clothes and not for storage, blocking off the hot air duct leading into the room if warmth can be maintained or, if not, adding an extra filter to the register. This filter can be removed, washed and replaced frequently. (See also page 301.)

Keep the child at home unless the child has some systemic disease which needs hospital care or the lesions are such that home therapy is impossible. The dangers of complications from the hospital are too

great a risk. One must balance the dangers against the benefits and make a decision on that basis.

Parent Counseling

The disease is an extremely disturbing one which not only involves the patient, but also upsets the entire family. The mother comes to you emotionally upset and physically tired from being up many nights and spending most of her days caring for a crying, scratching child. The entire family may be disturbed. The parents may have been told that nothing more can be done and that nature will have to take its course. It is our practice to explain the disease to the mother and discuss its natural course. We tell her, and often the father, that the disease is not hopeless, that there are many things which can be done for relief, that the skin will be normal and not scarred later in life. Be sympathetic and reassure the family when its morale lags. This is extremely important in the treatment of this type of eczema.

If the child has a great deal of pruritus and is emotionally upset, it is wise to give sedatives which will relieve the excitement and raise the "itch threshold." Noctec and Atarax are both beneficial. Atarax seems to be better than Noctec, since it acts as a very efficient antipruritic and tranquilizer without producing too much sedation. Noctec is given in doses of 1 teaspoonful 3 or 4 times daily. Atarax is given in doses of 10 to 25 mg. 3 or 4 times daily. This is the best systemic antipruritic we have found and makes the fractious child much easier to handle.

Local Measures

For pruritus locally and to prevent trauma, the mother is asked to put cotton stockings and long sleeves on the patient over whatever ointment is to be used. If this is not enough, the areas are also bandaged with Ace bandages. These are changed one at a time in order to prevent the child from scratching the freshly uncovered skin while other bandages are being removed.

Local treatment is probably the best of all types of therapy, but unless one has had experience in its use it is best to call for help. Remember that in oozing lesions one should use watery things. Use weak drugs on acute lesions. On more stubborn and chronic lesions one may use stronger medication. It is best to state here that before one uses ointments or any other local medication for eczema a test patch should be applied. This is done by applying a small amount of the material to be used to a small area of affected skin. If no reaction has taken place within 24 hours, it will be safe to use the material for treatment over all affected areas.

In the acute erythematous oozing stage wet dressings or watery solutions are best. We use normal saline solution as continuous soaks more than any other. It is best to know the use of one or two solutions and use these rather than to try many things with which you are

unfamiliar. Potassium permanganate (5 grains to 1 gallon of water gives a 1:12,000 solution) as wet dressings 2 to 4 times a day for 30 minutes is good. Another good preparation is Burow's solution as Domeboro tablets (Dome Chemicals, Inc.) (1 tablet to 1 pint of water giving a solution of 1:20) 20 minutes 3 or 4 times a day. Many other solutions such as 0.25 per cent silver nitrate or 2 per cent aqueous gentian violet are suitable.

Between the acute and more chronic stage, when the lesions have lost their erythema and have stopped oozing or are oozing less, pastes or shake lotions are applied thinly in order not to seal off what little serum may be present. The itching usually is less here, but, if present, anti-itch lotions are indicated. One may use zinc oxide paste (Lassar's paste) alone or in conjunction with an antipruritic, Acid Mantle Creme (Dome Chemicals, Inc.), Vioform Creme 3 per cent (Ciba), Neobase (Burroughs & Wellcome), and Schwart's Ointment (salicylic acid, 30 grains; mercurichrome crystals, 20 grains; with water enough to dissolve; anhydrous lanolin and petrolatum jelly, equal parts of each to make 1 ounce). Schwart's Ointment was advocated by Hill several years ago and is very useful. Itching can be relieved with Caligesic Ointment (Merck, Sharp & Dohme) or Lewis Webb Hill's anti-itch lotion (liquor carbonis detergens, 4 grams; phenol, ½ gram; menthol, 10 grains; powdered tragacanth; Neobase, 2 ounces; camphor water, enough to make to 8 ounces).

In the chronic form, characterized by induration, lichenified plaques and often with secondary infection superimposed, one should first control the secondary infections by wet soaking with Burow's solution, potassium permanganate or normal saline solution followed by local applications of bacitracin, erythromycin, neomycin or a mixture of these ointments and 3 per cent Vioform Creme (Ciba). It is best not to use penicillin or sulfa ointments because of the high incidence of sensitization.

Systemic therapy is used if the secondary infection cannot be controlled by local therapy. Since the most common organisms found are staphylococci and streptococci, one may use either penicillin in adequate doses intramuscularly or erythromycin orally. When a cure or remission is not prompt, it is our practice to hospitalize the patient for special care if we can be assured that good nursing care is available.

After the infection has been relieved the next step is to use therapy which will produce keratolysis and hyperemia of the skin. Tar in some form is by far the best drug to use for this purpose. Weaker strengths are utilized for the less chronic types and stronger tars for the more chronic types. Every physician treating eczemas has his own favorite type of tar ointment. The proprietary preparation, Mazon ointment (Belmont Laboratories), works nicely. It contains sodium stearate, benzoic acid, salicylic acid, tars and mercury salicylate (0.06 per cent). The exact amounts are not specified. It may be bought without a prescription and is used in conjunction with Mazon soap. Other good mixtures consist of 3 and 5 per cent tar ointment made up in a zinc oxide base. However, they are messy and stain. Dome's Daxilon ointment (3 per

cent) is satisfactory, but it is also black and stains. Kolpix Creme (2 per cent) is a good ointment. It is a combination of vitamins A and D ointments, but is not as good as the old ointments. Other non-staining white tars, obtained by steam distillation, are used in 5 and 10 per cent ointments such as Supertar (Talby-Nason) and Taralba (Upjohn).

It is well to have a number available, since the prolonged use of one seems to make it less effective. It may be advisable to rotate the tars. Also it is well to remember to keep the child out of the sunlight while he has tar on his skin, since tars are photosensitizing.

Vioform Creme in 1 to 3 per cent strength is excellent at this stage. In fact it has been the answer for us in many children who were not benefited by tar ointments. In mild superimposed infections caused by bacteria or fungi, this drug has been useful. It may be used with 2 per cent tar with excellent results.

Steroids are effective when used locally in 1 to 2.5 per cent strength in a simple base or associated with neomycin. We more frequently use Cort-Dome Creme, 0.25 per cent, for economy, but, if necessary, use 0.5 to 1 per cent strength. It has been shown that this concentration in this base is more effective than several times this strength in other preparations because of the quick drying effect of the base. We also use Neo-Cort-Dome Creme, which contains 0.25 to 1 per cent hydrocortisone and 5 mg. per gram of neomycin sulfate.

Soaps are not good for the skin in atopic eczemas. Therefore soap substitutes are used. They all "suds up" and remove dirt, debris or dry ointments very nicely. The mother is asked to use Mazon, Lawila Cake (Westwood Pharmaceuticals), Dermolate (White Laboratories) or pHisoderm (Winthrop-Stearns) instead of toilet soaps.

Systemic Steroids

It is occasionally necessary to use steroids orally for some atopic eczemas, but only in severe exacerbations. In intractable cases which do not respond to anything else its use is sometimes followed by a response to the same conventional methods which have failed before. It can be used to prepare the skin for testing when the eczema leaves no good areas for such procedures. Young girls with chronic antecubital eczema may feel that it is important for them to make a good appearance at some social event. For psychological reasons one may resort to the use of systemic steroids temporarily at such times. Otherwise the general use of systemic steroids is avoided if possible. This is especially true in the prolonged use of even the newer steroids, which give fewer side effects. When it is necessary to use these drugs, one should begin with larger doses to control the lesions and then reduce to the lowest dose that will maintain this status. A satisfactory one is Aristocort (Lederle) in doses of 20 to 40 mg. daily, rapidly reduced to 4 to 8 mg. daily. This usually keeps the lesions under control.

SUMMARY

One should treat atopic eczema by a broader approach than that which takes into consideration the allergic factor alone or the dermatologic factors alone. Infants are treated by food eliminations and local therapy. Older children are treated by local measures and environmental control. It is our practice to confer frequently with a dermatologist. One should take the allergy approach, but local therapy is not to be neglected. Tar is thought to be the best drug to use locally, either alone or in combination with other drugs. Local steroid therapy is frequently used. We feel that this is much safer than systemic steroid therapy and resort to the latter only in intractable cases.

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UNDESIRABLE HABITS

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Understanding, tolerance and patience are needed in counseling parents and children with so-called undesirable habits. This encompasses many things, such as thumb-sucking, nail-biting, rocking, head-banging, masturbation, stuttering, temper tantrums, night terrors. The frustrated, disturbed parents are asking for specific advice on what to do to "cure" their child, and they want it done now. This is practically impossible, but the physician can help greatly.

CAUSES

In order to handle such problems, the physician should have a clear view of what is involved. Basically all these habits or behaviorisms are outlets for emotional tensions. The infant, as well as the older child, has feelings both good and bad, and he must have some means of expressing them. If he cannot do this, they build up tensions, and a safety valve to "blow off the steam" is needed. If this valve consists of normal everyday activity such as running, yelling, playing, all is fine. If for some reason his tensions cannot be expressed in this way, he may resort to an undesirable outlet.

The type of behavior manifested will depend upon the age of the child. In infancy it may be excessive thumb-sucking, screaming or temper tantrums, whereas in a six- or seven-year-old child nail-biting, stuttering, eye blinking, and so on, may prevail. The manifestations of tension displayed in infancy carry over, however, and may continue to present themselves in older children. This, in itself, may be a clue to the time of onset of this behavior and help determine the etiology. It is important to remember that basically the cause of these undesirable habits is tension.

The causes of emotional tensions within an infant or older child are many and in some cases are so complex that psychiatric help will be needed. As a rule, however, they are centered about the parent-child relation. It is not fair to put all the blame on the parents. Usually

they are doing their best to raise their children happily. Unfortunately, there are circumstances which hinder or prevent parents from handling their children as they intellectually know they should. In this connection there is a basic principle for management of these cases. Allow the parents to discuss their problems at length without condemning them and show sympathetic understanding. Help them to recognize their difficulties and then guide them into better or more successful ways of handling their children. One must always remember that telling parents what to do is not enough. Parents must see what is to be done. They must understand why. Then allow them to tell you what they can do. Otherwise your advice will not be accepted or followed.

In discussing some of the common undesirable traits it is to be kept in mind that the statements are general and not specific. Every infant or child is an individual, and each parent has his own personality shaped by his own upbringing. Since no two persons are alike, the same advice will not necessarily apply to all.

TEMPER TANTRUMS

These may start in early infancy and continue throughout life. Infants become frustrated and cannot fully express themselves, so that they may go into a fiery rage. If this means of expression brings about the desired results, that of gaining attention or attaining their goal, it will be used time and time again. It would be well to remember the words "attention gaining," because the infant is gaining the attention he is seeking one way or another if the handling of this situation is by excessive loving or fondling or by spanking. It is not to be implied that one should completely ignore an infant in a tantrum, but it is wise to handle the child calmly and relatively indifferently. The parents should let him know by their actions that they are not disturbed or upset and that they love him regardless of his behavior. There is a more important need to be investigated. What causes the tantrums, and what could be done to avoid them? Is the child overtired physically? Is he bored? Is he hungry? Does he feel bad? The best treatment for temper tantrums is prevention. When the parents are made aware of this, they will probably come up with the best answers.

Breath-holding spells are at times a form of temper tantrums and should be handled in the same way. Some infants with breath-holding spells become stiff and cyanotic and lose consciousness. They may go into a deep sleep afterwards. These spells are suggestive of epileptic seizures, and an electroencephalogram should be made. If a dysrhythmia is found, supporting the diagnosis of epilespsy, Dilantin and phenobarbital are of extreme value. In our practice most of the breath holders with these symptoms have responded dramatically to these medications. Actually, one must be aware of this possibility in some cases of temper tantrums when the infant has the same symptoms described previously. These are referred to as psychomotor seizures.

ORAL MANIFESTATIONS OF EMOTIONAL TENSIONS

There are a great many ways children have of expressing emotional tensions through their mouth. The manner of this expression depends upon the age of the child. According to psychoanalytic doctrine, the earliest means of gratification of individual emotional needs is through the mouth. It is not surprising that if pleasure is obtained in this manner, displeasure or emotional tension will also be manifested in this way.

Thumb-sucking during the first few years of life is not an undesirable habit unless the parents are greatly upset by it. Thus handling parents of infants is simply a matter of making them realize that the child has an excessive sucking need, is bored and has nothing else to do. For the infant who has a strong sucking need a pacifier is excellent. Many investigators have shown that thumb-sucking is less of a problem in infants who have used pacifiers than in those who have not. It must be remembered that a pacifier is used to satisfy the sucking need, but is not a substitute for the emotional need of the infant.

As a rule the more attention one pays to thumb-sucking, the longer will it persist. Almost anything the physician prescribes will probably be unsuccessful, and in the end the parents will become even more greatly concerned about this habit. Their feeling of inadequacy will become greater and the emotional tension increased. Not nearly as much anxiety is aroused if the parents wish to try means of their own and are unsuccessful.

The older the child, the more significant thumb-sucking becomes. In itself it is not usually a serious factor in disturbing the child's mouth. Practically speaking, scolding, hand-slapping, local lotions, braces, and so on, have not been successful, and the child is harmed far more than helped. He develops a greater inferiority feeling and a tremendous sense of guilt and becomes even more miserable.

Probably the best approach is to recognize this as a symptom of the child's inner emotional tension and to try to interpret it as such to the parent with the hope that in the ensuing discussion the source of this inner tension will be uncovered and corrected. Parents need to be reassured that thumb-sucking, in itself, is not a serious problem and that children will eventually discontinue it. They should try to make the child's life fuller, happier and more relaxed.

Sucking or chewing on blankets or dolls can be another oral outlet of tension, but as a rule it is more of a comforting sensation. The child uses a familiar object, which is usually soft and smooth, pleasing and gratifying. Taking this object away abruptly is cruel and unnecessary, since the habit is neither serious nor destructive. Actually, adults chew on cigarettes or pipes and older girls take teddy bears to bed with them without critical comments from society. It may be felt that the habit must be discontinued because the child is being teased or because the parents are greatly upset. Sucking a blanket can be stopped by cutting the blanket in half and then in half again and again until only a

scrap is left. If a fuzzy dog or doll is used, a smooth chintz one can be substituted for it, and then this can gradually be removed. At no time should the physician allow himself to be upset by this type of behavior, for it will only result in the parents' becoming more anxious, and they in turn will put more pressure on the child. A more serious habit may be substituted if the child discards this outlet before he is ready.

NAIL-BITING

Nail-biting is extremely common in the adolescent, but is also present in infants and children. In some cases this may be just a habit. For the most part, however, it is an expression of repressed anxiety and hostility directed at either themselves or others. In the younger children it will be of help if the parents will allow these youngsters to express their feelings without restraint or punishment. The parents must understand that their children may dislike them at times and even say so. However, this does not displace the good feelings their offspring have towards them.

In the teenager with his bundle of anxieties and worries too numerous to list and too difficult to understand, the nail-biting trait is as difficult to stop as cigarette-smoking is in the adult. One way is to build up his ego with positive comments and do less criticizing. These older children also need to have the freedom of expressing their feelings to a friendly and noncritical listener. For the most part the physician can do little else directly. Indirectly he must try to help remove parental pressure and, at the same time, help the child build up his ego and find a happier and more pleasant means of expressing himself.

Hypnosis can be used to stop nail-biting, but it is not advisable unless psychotherapy is used simultaneously to relieve the inner anxieties. Otherwise a substitute outlet for this expression of inner tensions will result, and this may be even worse than the nail-biting.

ROCKING AND HEAD-BUTTING

The infant or child known as a rocker is using this to-and-fro-swaying sensation as a soothing, comforting, rhythmic means of self-expression. It is for the most part self-limited and should not be a center of great concern. A tight crib that is well padded, with the legs placed on carpeting or on a spring so as to limit its bizarre wandering resulting from this rocking, will do wonders in relieving parental concern. In time the habit is discontinued and a crisis is avoided. For the occasional child in whom it persists a more thorough understanding is needed to evaluate the underlying tensions.

The head-banger, like the rocker, is not necessarily severely disturbed or a mentally retarded child. It may be a means of expressing his feelings. Like the rocking habit, this too will pass. A well padded crib or even a helmet may be needed to prevent damage to the head caused by the knocking, but the greatest help will be advice given to

the parents. They should comfort the child and not criticize him. Soft music, affection and more attention will help many of these children if the parents can do this comfortably.

MASTURBATION

This subject is first taken up with the physician when a one- or two-year-old child starts playing with his genitals. If at that time the parents are reassured that this is nothing but an infant discovering part of his body and has no great significance, they will accept the explanation and the child will soon stop. When the parents become too greatly concerned about masturbation, it is usually they that need re-educating and reassurance. They need to know that the old wives' tales about masturbation causing insanity, oversexuality, and so on, are false and that no physical or emotional harm will come about as a result of this practice per se. Among adolescents a certain amount of masturbation is normal.

In the occasional case in which overindulgence persists one should look for tensions. It is wise to advise the parents that the more they do to stop this habit, the more fixed it will become and that if it is not manifest publicly, it will be practiced in private. Punishment, whether it be physical such as slapping or spanking, verbal such as fussing or threats, or merely an unhappy expression of disapproval, will create a much greater guilt feeling in the child. He will then become even more greatly disturbed and be more apt to prolong the symptom. The worse the child thinks of himself, the more serious the consequences will be.

The adolescent needs to have his ego built up. He needs to be accepted socially and physically as well as psychologically. If adequate outlets are provided for the expression of inner tensions, masturbation will cease to be a problem. At the same time the teenager must be made aware of all the facts of life, and sex should be thoroughly discussed. There are many books available for those parents who find difficulty in discussing this subject freely with the teenager. Parents should be made aware of the fact that they may inadvertently overstimulate their children of the opposite sex by their own exposure, excessive fondling and by many of their actions in general.

NIGHT TERRORS

One of the most disturbing problems confronting a parent is the young child who awakens from a deep sleep in a frenzy, crying, screaming or yelling. This may start as early as three years of age and may hit its peak at five to seven years. The content of their dreams will vary from animals to trains, to people, and so on. I leave the significance of the dreams to the psychoanalyst, but it is sufficient to recognize that the fear expressed by the child is real to him.

Our sleep world is another world from the one we know while awake. People live another existence in their sleep, "the world of the

subconscious." What influences the subconscious is complex, but if it is painful, there will be a fear of sleep. If it is mysterious, there is a reluctance to enter into this world of sleep. The infant takes his bottle or doll to sleep with him for security. He hopes to maintain contact with the real world in this manner. Adults sometimes awaken exhausted even though they have slept their usual number of hours. So the concept of the subconscious world of sleep is not a fantastic or unrealistic one.

Young children cannot control their emotions well. After entering sleep a fearful dream happens, and they awaken frightened. Making the child's world as pleasant and happy as possible is a wonderful means of avoiding night terrors. Eliminating fearful experiences or keeping them to a minimum will help. These children need comforting and reassurance. They need to know that all is well and that they are safe when they awaken. If they are sound asleep and have these night terrors, they should be awakened even if cold towels are needed to arouse them. Sometimes a night light in the room will help the child and give the reassurance and comfort he needs. Overexhaustion seems to precipitate fearful dreams. Sedatives and tranquilizers are helpful in decreasing their frequency, but the greatest help is obtained by relieving the inner anxieties and emotional stresses which are creating problems for these children. The parents need to be reassured that these children will eventually cease to have night terrors.

SUMMARY

Undesirable habits are an expression of emotional anxiety in children. Consequently the relief of these habits is logically obtained by attacking the cause—namely, the anxiety. Several common undesirable childhood habits have been discussed with this viewpoint in mind.

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BEHAVIOR PROBLEMS

JAMES W. BRUCE, M.D.

Behavior problems are reactions to situations in which normal instincts and emotions have caused children to act in an unusual manner. In adolescents these reactions are more often serious and may result in their defying the laws and customs of society. In other words, one might say that behavior difficulties are the result of normal human instincts and emotions gone "haywire."

Let us consider the strong instinctive and emotional drives which motivate human conduct: (1) self-protection (defense reactions), (2) ambition (attention-attracting devices), (3) rebellion (negativism), (4) revenge, (5) cruelty, (6) jealousy, (7) sex.

SELF-PROTECTION OR DEFENSE REACTIONS

Examples of this instinctive behavior are numerous. All mothers and nurses are familiar with the defensive tactics used by children to put off "shots." Another problem, as he grows a little older, is the withdrawn child. He will not play with the group because he feels that he cannot compete successfully in its games. The defensive headache or pain in the stomach or the vomiting attack that comes just before time to go to school may defy the diagnostic skill of the attending physician until he discovers that the symptoms never occur on Saturday. Crying is the most common method of defense and makes the medical examination difficult or impossible.

AMBITION

This is a trait which all people have in more or less degree. In children it assumes a very elementary form, the desire for attention. They love to be noticed and enjoy having complimentary things said about them. Their worst punishment is to be ignored. Sometimes this desire to get attention takes the form of pretending to be sick. Some children seem to like to have their parents become worried and call the physician on their account. All physicians have seen many instances when their

little patients had nothing wrong with them except a desire for attention.

Billy, age 4 years, had always been in robust health. His brother, age 5 years, had always been a sickly child and had required a great deal of medical attention. One day Billy suddenly complained of violent pain in his abdomen. The physician was summoned, and Billy was taken to the hospital. Physical examination and laboratory tests were completely negative. As soon as his examination was over Billy bounced out of bed and began playing with the children on the ward. There was obviously nothing wrong with him except that he was jealous of the attention his brother was receiving. When this was explained to his mother, she became angry with her physician and discontinued professional relations with him.

This reaction exemplifies the fact that parents do not accept the diagnosis of malingering graciously. I have learned by several experiences that personal interviews—not telephone conversations—are necessary. Then the case can be reviewed in detail patiently, sympathetically and diplomatically. After some discussion of organic diseases that have been ruled out a parent may say, "Well, Doctor, maybe it is his nerves." That is the lead which will enable the physician to explain his patient's problems to the parents without offending them.

Tommy was the only child of parents who had reached their middle forties before he was born. He had been force-fed since his birth by his overanxious mother. He learned that by vomiting or threatening to vomit he could make her stop overfeeding him. He learned to vomit at will. At 4 years of age he was put in a nursery school. One day he walked to the middle of the circle of children and announced, "I am going to vomit!" and proceeded to empty his stomach contents upon the floor. Then he stood back with the pleased smile of a satisfied performer. The teacher quickly diagnosed the situation, but instead of calling a physician she put Tommy in solitary confinement as punishment. Needless to say, Tommy never vomited in school again.

REBELLION (NEGATIVISM)

Rebellion is an instinct that is present in everyone. We rebel at commands that we do not understand or that we consider unjust or erroneous. Rebellion is common at ages one through four years. At this time the child is developing motor skills rapidly. He is constantly climbing, lifting, pulling, pushing. He resents interference with his activities. He does not understand the dangers of high places or hot stoves or sharp scissors until he has fallen or been burned or cut. His feeling of frustration leads him to rebellion against parental authority. The adolescent is in somewhat the same situation. He is going through a process of rapid growth and development of his physical and mental powers. He too resents interference and rebels against authority at home or at school.

Rebellion of little children is best treated by calm and even, but firm and loving, care. It is during the first five years that the mother figure is formed in the child's mind. This is a person to whom the child can go for comfort, help, understanding and love. It is not possible for the child to form a mother figure if several people divide his care among each other. Children who grow up without developing this mother figure are never able to bestow love themselves. They become fertile ground for juvenile delinquency later.

The best form of punishment for children below the age of five or six is isolation in a room where they have nothing with which to play or hurt themselves. Confinement in the isolation room is best limited to 15 minutes. If results are not satisfactory, it can be repeated. Forceful methods of discipline such as spanking or slapping are apt to backfire and may produce resentment in later years.

Treatment of rebellion in the adolescent is too large and controversial a subject to be discussed in a paper of this length.

REVENGE

Revenge is such a universal instinct among people of all ages that it is not necessary to elaborate upon it here.

CRUELTY

This is an instinct which is present in all infants whether they are born in the best private hospital or in the heart of Africa—they are all born savages. The cruel instinct can be tempered by gentle loving kindness or aggravated by unsympathetic mental or physical care. One of the best ways to teach a child kindness and to curb this instinct for cruelty is to give him a dog or pet of some kind and teach him to feed and care for the animal. Cruelty raises its ugly head on the playground where weaker children must be protected from bullies and in school where the child who has a speech defect may be laughed at. Teasing is a form of cruelty that is found in many places. Children tease each other, they tease their school teachers, and they tease their parents. Teasing is an insidious thing that breaks down morale if it is allowed to continue. Unfortunately, the subjected person sometimes does not realize that she is being teased. This is particularly true of parents. They will not believe that their own children are teasing and voluntarily making trouble for them. Teasing is bad for both the perpetrator and the victim and should be stopped immediately and punished effectively.

JEALOUSY

Jealousy is a universal human frailty. We find it in aggravated form in the first-born child in a family upon the arrival of a new baby. It may take the form of inflicting bodily injury upon the new arrival. A child up to the age of five or six years should never be alone unsupervised in the room with a small infant. A more common form of jealousy is reversion of the older child to the infant level. A child who has learned to attend to himself perfectly in the bathroom may begin to wet and soil his clothes by day and wet his bed by night when a baby sibling arrives. The child who is loud, boisterous or destructive may simply be manifesting jealousy.

Jealousy cannot be completely prevented in a family, but it can be minimized. Parents should be absolutely fair and impartial in dealing with the problems and tensions that arise within the household.

SEX

I do not believe that sex enters into the thoughts and activities of children until puberty begins to develop, i.e. 8 or 9 years in girls and 10 or 11 years in boys. The leaders in children's groups are those who are physically the strongest or mentally the most agile and aggressive. There is frequently a bond between boys and their mothers and girls and their fathers. This is explained by the fact that parents—the sexually mature persons—give preference to the children of the opposite sex. This preferred treatment is returned in kind by the children. After puberty, however, sex is a potent factor in juvenile behavior.

SUMMARY AND DISCUSSION

In dealing with behavior difficulties it is important to recognize the motive which instigated the objectionable activity. These motives are based upon several instincts or emotions. The young child usually acts from more or less transparent motives which are the result of a single instinct or emotion. As he gets older his motivation becomes more complex, but can still be traced to certain basic drives. In the case of Billy, who pretended to have a pain in the abdomen, his motive was a combination of jealousy toward his brother and ambition to get medical attention. Stealing may arise from different motives, depending upon the object stolen. The boy who steals a baseball glove may be jealous of the owner of the glove and may then become ambitious to be a better ball player because he now has a good glove. On the other hand, the boy who steals food may be actuated by defense against hunger. The boy who steals the ice cream from a party may be actuated by a cruel desire to cause embarrassment for the host, in which case hunger has no part in his motivation. Juvenile delinquency arises from all seven of the instincts and emotions mentioned. Frequently it is largely a desire for attention, a misguided ambition for publicity.

The two most important questions in studying behavior problems are (1) What was the child's motive in committing the act? (2) What benefit did he hope to gain from it? There is always a motive, and there is usually an anticipated benefit to be gained in every act a child performs. Before any physician can attempt to manage such problems he must first understand the motivation behind the misbehavior.

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ENURESIS

MARTIN Z. KAPLAN, M.D.

Many parents think any child who wets the bed at night, regardless of age, is abnormal—an enuretic. The physician should reassure parents that a majority of children wet their beds until the age of five and that this is not abnormal before this age. Unfortunately, in our society, so much emphasis has been given to the problem of bed wetting that most mothers do not feel themselves adequate if their child is not dry at night by the age of two or two and a half years. This overemphasis may be a cause of enuresis. A child matures physically and emotionally with time, and excessive pressure on the child to mature sooner will have adverse effects. Physically, when a youngster's bladder enlarges enough to retain a sufficient quantity of urine, he will be ready to stay dry all night. In some cases this will happen at two and a half to three years, but in others it may require several years longer. A child may be physically developed to a stage at which it would be possible to give up bed wetting early, but if he is emotionally immature, his enuresis may be a manifestation of his anxieties, hostile or guilt feelings, or other emotional problems.

EXAMINATION

The investigation of an enuretic child requires more than just a routine history and physical examination. A careful evaluation of the emotional status of the parents and the child and their interrelationship is important and needs careful study. Physical causes account for only a small percentage of enuretics. If the young patient is dry during the day, has no dribbling of urine and no incontinence, no burning or pain during urination and a normal urinalysis, any further work-up will do nothing except fix the enuresis in the child's mind. Young children associate sexuality with their urinary system, and severe psychic trauma can be the end-result of an overenthusiastic examination. Thus cystoscopy can be traumatic physically and psychologically. Older children can understand the need for complete examinations, and one need not be so reluctant to carry them out. The physician should never

show any disrespect for the child and should maintain discrete privacy. If a physical cause is found, it should be eliminated or relieved at once. Such physical causes would include pinworm infestation.

CAUSE

Faulty training may be the etiologic factor in some bed wetters. Some parents, for instance, keep their child in diapers for an extensive time over and beyond the usual two years. The parents do this with the assumption that the child is going to urinate, and they selfishly want to eliminate soiled linens. These parents rationalize in many ways, frequently stating that they want to keep the child from being chilled. In reality the diapers and rubber pants merely give the child the parents' sanction to remain a baby and to urinate as freely as he wishes during the night. It is difficult to stop this habit once it is established. Many cases of enuresis can be stopped by having the parents put the child in training pants and treating him as an older person. They should leave a night light on to show him the way to the bathroom. If the child is made to feel more grown up, he will act older and drop baby habits. At times it may be necessary for the parent to awaken the child three to five hours after he has gone to bed, making sure he is thoroughly awake, and take him to the toilet. The parents should see that he urinates and then take him back to bed. This gets the child accustomed to holding his urine longer, builds up his bladder capacity, and makes him more aware of his own ability to stay dry.

Parents of the child who has a severe emotional disturbance are often reluctant to face the fact. If that child is enuretic, they use the symptom of enuresis as the focus of their child's behavior problems. The physician should be able to identify these cases and not get himself trapped into trying to treat a symptom. In order to accomplish anything he must attack the underlying cause of emotional distress. Referral to psychiatrists or child guidance clinics is definitely indicated in these instances.

TREATMENT

The mildly emotionally disturbed child may be regressing to infantile behavior because of such situations as sibling rivalry, parental conflict, new home situations and the like. These can frequently be discussed with the child and the parents, and the enuresis will subside. In many cases, however, the stress producing the situation or the reason for the child's bed wetting cannot be found. The child's problem can then be approached in any one of several different ways.

After reviewing the literature on the various types of treatment one can conclude that in all of them the phenomenon responsible for success is basically positive suggestion. This applies to anything from the administration of drugs such as ephedrine to the use of the automatic bell-ringing, light-flashing alarm system. As a matter of fact,

some surgical cures of enuresis are probably due to the positive suggestion rather than to the operation itself. Children react strongly to positive suggestion, and we know that they really want to stay dry at night. They inadvertently wet their beds, so that all they need is a push in the right direction.

My approach to handling enuresis is primarily through positive suggestion, although I use psychotherapy on the parents and the child at the same time. I talk with the parents first in order to find out their feelings about bed wetting and try to relieve their anxieties and fears for their child's future. I tell them that the child will do well and that they are not to take an active part in the treatment. They must be available to help the child at any time he asks for it, but they are not to check on the child or to remind him of his responsibilities.

I then confer with the child, indirectly bringing up the subject of bed wetting. One must remember that these children are upset and feel guilty. One must be careful not to make them feel even worse. When the subject is finally approached, the child is asked whether he wants to stop wetting his bed. The response is an emphatic "yes" in all cases. He is told that he can stop his bed wetting if he wants to by himself and that I can help him if he would like me to. He immediately asks for this help and is given the following instructions.

He is to discontinue drinking fluids after dinner, because this will cause less urine to form, and the need for urinating at night after going to bed will be decreased. This is readily understood and accepted. During the day he should practice holding his urine for as long as he can. This is done to build up his bladder capacity. When he does urinate, he should practice letting go and holding, thus building up the strength of his bladder muscles. This, too, is readily understood by the child, and he can see the value of this in terms of helping himself. He is then given a bottle of vitamin pills or occasionally some mild antispasmodic and informed that one pill at bedtime will help him hold his urine better, but that if he does have to urinate, it will enable him to awaken to go to the bathroom. The instructions are repeated in detail, and the child then repeats the instructions to me. All this is done in such a manner as to impart a firm belief that this is definitely going to cure him. He is told that the enuresis is his problem, the pills are his alone, and that he is to take them by himself. He does not need help from his parents, but if he wants it, he can ask them for it. The child is then asked to call me in one week to let me know how well he is doing. Since I have taken the stand that he is going to do well, I do not insist on a return visit. I do not have statistics to verify the success or failure of this method, but I feel that the results are 75 to 90 per cent effective.

Hypnosis is just another form of positive suggestion which is valuable as a tool in older children who are not influenced adequately by the previously described routine. In my experience it has not been successful in severely disturbed children, and I have discontinued its use in those cases.

SUMMARY

Each enuretic child has to be considered individually, and the treatment will depend upon the findings. The majority of these children are only mildly disturbed and will respond to positive suggestion in one form or another.

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A PRIMER OF OFFICE SURGERY

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Even though the term may imply that it can be tackled in the office, minor surgery is something which you should not do there unless you *know* you can do so. If this seems like obviously good advice, there is another equally trivial nonmedical detail which many of us have learned only from frustrating experience: namely, one should never rely *entirely* on a member of the family to hold the child. The father seems particularly unreliable and susceptible to fainting.

There are two technical matters which might well be classified as general rules in the office practice of pediatric minor surgery. The

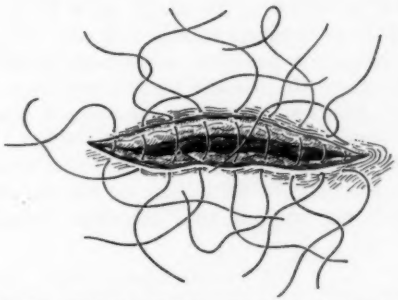

Fig. 36. The result of putting sutures in before tying them.

reason for the first one is obvious from Figure 36—do not put all your sutures in before tying them. The second admonition is never to extend a laceration as the plastic surgeons do unless you are a plastic surgeon. Finally, when everything is over, have the patient's parents wait until syncope is no longer a threat before allowing them to leave the office.

EQUIPMENT

It is suggested that instruments be purchased with prudence and conservatism. The actual number of items needed is small. It is wise,

however, to have two identical sets so that one can always be sterile and ready for use. Details of items needed, packaging, sterilizing and storage are covered elsewhere in this volume (see p. 387).

PREPARATION OF THE WOUND

If wounds are extremely dirty, it may be necessary to admit the patient to the hospital where a general anesthetic can be given in order to properly prepare the wounds. However, most wounds not grossly dirty can be satisfactorily prepared by using copious amounts of sterile water, sterile cotton pledgets and a liquid soap or detergent containing hexachlorophene. This can be done before infiltration with the local anesthetic so that after this preparation the wound may be draped and treated as a surgically clean one. We have never shaved the eyebrows, but have included shaving of hair in other locations when necessary as a part of preparation of the wound.

Tetanus prophylaxis must never be neglected. The details concerning the indications, administration and precautions to be observed in the use of toxoid and antitoxin are discussed elsewhere in this volume (see p. 27).

LOCAL ANESTHESIA

In instances in which only one or perhaps two sutures are needed it may be as painful to inject an anesthetic as it would be to go ahead and put in a needle with suture attached. It is worth considering that infiltration with Xylocaine has some advantages in addition to the loss of sensation it produces. It lifts the tissue away from the larger underlying blood vessels (Fig. 37). Varying the amount injected in different areas facilitates good alignment of the skin edges, especially if the wound is irregular or if one side is retracted. This is not to imply that this procedure is a substitute for closure of the deeper structures with catgut, and it will not prevent the "trap-door" healing of a beveled laceration.

Fig. 37. Method of infiltration with local anesthetic.

SUTURE OF LACERATIONS

We never attempt closure of a laceration in the office unless it can be done under a local anesthetic. An even more practical consideration is that unless the child can be handled with the help available, it is unwise to begin. There are a number of lacerations which are routinely referred: (1) lacerations of the nose; (2) lacerations of the eye, the edge of the eyelid or of deeper structures of the lid; (3) lacerations associated with compound fractures; (4) those accompanied by trauma to nerves or tendons; (5) lacerations of the palate. Lacerations of the tongue, buccal mucosa, and inner surface of the lips almost never require sutures and usually heal without deformity or difficulty. In any case one hopes to have the least possible scarring, not only for cosmetic reasons, regardless of location, but also for best functional results. The scar from a young boy's scalp laceration may some day be in full view.

A laceration on the sole of the foot must be closed with sufficient strength to hold together if the patient walks on it. Sutures should not be put too superficially—they will cut through the thick skin and allow the wound to pull apart. The appearance of the scar there may be unimportant, but a scar that is satisfying esthetically is not likely to be tender.

Repairs at the vermilion border of the lips must be done with great care, seeking exact apposition at the mucocutaneous junction. Secondary repair is even more difficult, making it all the more important to secure a good primary closure.

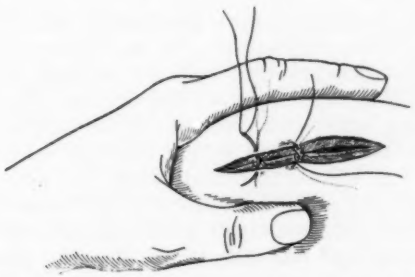

Fig. 38. Method of obtaining apposition of wound edges.

Apposition of most wounds is best obtained by first putting in a suture at the middle, followed by one at midpoints on each side of that one (Fig. 38). Facial lacerations are not bandaged. Tincture of benzoin is applied instead. The apparent purpose behind bandages is to protect from friction contamination, so that sutured wounds in other areas are usually bandaged. One should remember that extensive dermatophytosis may develop beneath dressings about the toes.

Sutures are removed from the face after 72 hours to avoid cross-hatching. Over joints or on palms or soles, however, they are left in place for a week. Wide, smooth-edged forceps, a centimeter or so wide, greatly expedite grasping the fine ties in the skin of a wiggling child. Use fine eye scissors for removal and hold them parallel to the skin

when approaching to avoid stabbing the patient. Unfortunately children regularly fall and break the suture line open again. However, these may be closed a second time with sutures about ¼ inch apart, and we give antibiotics orally if this occurs.

FRACTURES AND DISLOCATIONS

Many fractures in children are without serious complications, often without displacement of the fragments and probably not difficult to manage. Still, I make a practice of referring all fractures except some of those of the clavicle and uncomplicated nondepressed fractures of the skull.

Fractures of the Clavicle

After making x-ray films, such fractures can be adequately treated by the use of a clavicle strap and sling. Foam rubber strips covered with stockinet make excellent padding, and the free use of talcum powder helps to protect the skin further. The strap is left on for three weeks, checked twice weekly for pressure damage and friction points, and is tightened if necessary. The strap is removed after three weeks if the x-ray films show adequate callus formation.

Subluxation of the Head of the Radius

This occurs fairly frequently, and is most common in asthenic children between three and five years of age. The usual story is that the mother or some other adult has lifted the child by the hand or forearm, sometimes to help him up steps or onto a bed or stool. The child cries, lets the extremity hang limply at his side in pronation, and refuses to move or use it. Reduction is attained by grasping the wrist with one hand and pulling the arm forward to full extension. With the other hand at the elbow to push the radial head laterally, the forearm is then supinated and flexed in one continuous gentle motion. Such a patient is immediately relieved and promptly throws his arms about his mother's neck.

I personally refer all other dislocations except those of the phalanges. These are easily reduced and should then be splinted for a while if they are painful.

Fractures of the Nasal Bones

These fractures are frequently rather easy to diagnose in that there is usually obvious nasal deformity. X-ray study is unreliable in efforts to make a diagnosis. Asymmetrical soft tissue swelling may be misleading, but one can usually tell the difference by physical examination. I have no statistics, but this fracture must be relatively uncommon in children since I have seen only one in my office in the past 10 years (Fig. 39).

Fig. 39. Nasal fracture.

Fractures of the Lower Extremity

One should always be suspicious when there is pain above the ankle after a fall or twist even without swelling or crepitation. Fractures without displacement can behave in this way. Attempt to elicit more pain by squeezing the tibia and fibula together well away from the site of the pain and be sure that x-ray films show the entire leg.

TRAUMA TO THE EYE

Burns, lacerations and imbedded foreign bodies are referred to the ophthalmologist. Abrasions are also referred unless one can be certain that there is no involvement of the anterior chamber. Injuries produced by babies' fingernails are prone to heal poorly and produce vesiculation. Examination for trauma to the cornea may be performed more conveniently by the use of Fluor-I-Strip (Doho Chemical Corporation) and observation under ultraviolet light.

INGROWN TOENAILS

With proper care ingrown nails in children almost never need to be surgically removed. The ingrown nail can usually be freed by starting proximally with a blunt probe and working forward to free the imbedded nail edge. Then have the mother apply daily lateral pressure against the cuticle with a cotton applicator to prevent reimbedding of the nail edge. Emphasize that the nails are to be trimmed straight across (Fig. 40).

SUBUNGUAL HEMATOMA

Entrapped blood under pressure beneath the nail is very painful and can be promptly relieved by heating a piece of wire, such as a paper

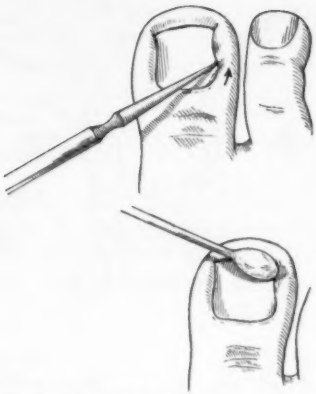

Fig. 40. Method of treating ingrown toenail.

clip, until it is red hot, holding it with a hemostat. Press it against the nail, and the entrapped blood will come out through the small, neat perforation. The entire procedure is painless.

RETRACTED PREPUCE

The retracted prepuce can almost always be reduced without resorting to a dorsal slit. Grasp the shaft of the penis with one hand and apply steady pressure while at the same time pushing the glans down into the foreskin with the thumb of the opposite hand. Apply the pressure steadily and do not be impatient (Fig. 41).

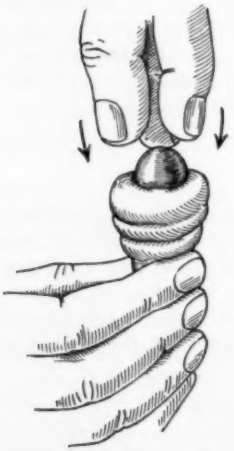

Fig. 41. Method of retraction of prepuce.

MEATOTOMY

This simple procedure can be performed by merely grasping the offending structure with a small hemostat. Only the initial grasp will be painful. Leave the hemostat tightly closed for about two minutes. Then remove it and incise the squeezed tissue with fine scissors (Fig. 42).

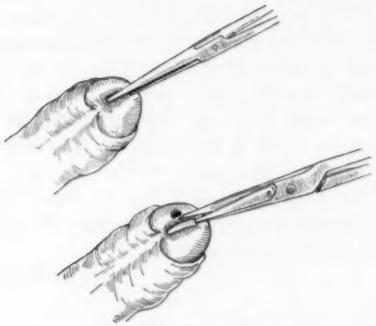

Fig. 42. Meatotomy.

PROLAPSE OF THE RECTUM

Reduction of a rectal prolapse can best be accomplished with the infant across his mother's lap, bottom up. Use a damp cloth or lubricant and apply steady pressure with the flat of the hand. After it has been reduced one should do a rectal examination. Then strap the buttocks. One should give consideration to the cause of the development of the condition. This would include various wasting diseases, but prolapse is commonly associated with mucoviscidosis. Finally, one should give attention to attempts at keeping the stool soft if the infant is constipated. Bran cereals are to be avoided.

WRINGER INJURIES

Wringer injuries are common, and it is strange, but true, that fractures are seldom associated with them. Soft tissue damage may be very serious, however, sometimes with exposure of the tendons and other deep tissues and destruction of the overlying skin and subcutaneous tissues. In any case, even the severe ones, we find that by far the best management in the period immediately after the injury is conservative.

This measure is an emergency to be accomplished as soon as possible after *any* wringer injury. It is carried out as follows: (1) Give medication for pain. (2) Rule out fracture by x-ray film. (3) Wash the entire hand and forearm carefully and repeatedly with large amounts of sterile water and soap with full sterile precautions even if the skin seems unbroken. (4) Put on a layer of sterile fine mesh gauze, being

careful to keep it from wrinkling. (5) Pad the hand and forearm heavily with repeated wrappings of sterile Kerlix bandage from the bases of the fingers to the elbow, allowing the digits to protrude through holes cut in the bandage. (6) Wrap the hand and forearm snugly from the bases of the digits to the elbow, cutting holes for the thumb and fingers to protrude in the same manner as with the Kerlix. (7) Fix tapes for suspension purposes along each side of the wrapped forearm and hang the upper extremity from a hook above the bed, from a coat tree, an intravenous fluid stand or other device. The child does not necessarily need to stay in bed. (8) Give tetanus prophylaxis.

Relief of pain will be most dramatic. The entire dressing should be changed and the arm inspected every 6 or 8 hours for the first 24 hours after injury and less often later on, depending upon the condition of the extremity. In many cases a few days of this conservative management will suffice. Even a seemingly trivial wringer injury should be given the benefit of this treatment for at least 48 hours initially. Definitive surgical treatment may be necessary later on, but this can be undertaken as an elective procedure.

SUMMARY

The foregoing procedures may seem like a pitifully small segment of all that comes under the heading of minor surgery. Nevertheless in the course of a single week the total amount of surgical activity, even when this is limited, is always surprisingly large. Sometimes it may seem humbling to refer so many of the cases. It may be appropriate these days to give thought to the possible medicolegal outcome of more ambitious surgical endeavor. This is aside, of course, from giving thought to the ethics of the case.

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THE BREASTS

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BREAST HYPERPLASIA IN THE NEWBORN

Incidence, Degree and Etiology

Breast hyperplasia occurs in the newborn period in both male and female infants. It appears at the third or fourth day of life and reaches a peak at the second or third week. The hyperplastic tissues usually regress and return to normal after the third week, but may persist well into the second month, when gradually the breasts return to normal. I have seen a number persisting well into the second month and occasionally into the third month.

The degree of hyperplasia varies widely. It may be barely perceptible, or the affected tissue may be so engorged as to produce profound discomfort and pain. A secretion similar to colostrum may be present, a secretion carrying the age-old name of "witch's milk."

Simple physiologic hyperplasia is a response to estrogens from the maternal circulation. The degree of enlargement seems to be related to the sensitivity of the end-organs of the breast tissue to the estrogens. Some have felt that the phenomenon is due to the maternal lactogenic hormone, but this condition occurs as frequently in bottle-fed babies.

Management

Although this simple, physiologic phenomenon has been observed for centuries, to each mother it poses a *personal* problem. Through the close relation between mother and physician, it is expedient to prepare the mother for this condition in postpartum instructions on care of the infant. I would include a discussion of this normal newborn variant. The mother is then prepared and will not be unduly alarmed when the breasts enlarge. One should not be complacent and disregard an

insecure mother's calls despite previous instructions. If she needs further reassurance, telephone conversations are usually unsatisfactory and totally impersonal. She needs the personal contact of a house call or an office visit. The time which the physician spends will be rewarding in the future relaxed management of the child and the confidence the mother will feel in subsequent situations.

The main points to stress with the mother are as follows:

1. *Do not* try to express any secretion. The breasts will eventually dry up.
2. Do not rub on any lotions or ointments. These may so soften the tense skin that microscopic breaks permit the entrance of pathogenic bacteria and cause subsequent abscess formation.
3. Cool compresses make the infant more comfortable if there seems to be pain.
4. A mild sedative may be beneficial to reduce the fretfulness (phenobarbital elixir, ⅛ grain every 4 to 6 hours as needed).
5. Reduce the total fluid intake for 24 hours by about one quarter. In other words, if one can put the point across, "hands off."
6. If the engorgement is extreme, testosterone may be of some value, but is rarely indicated. Some men feel that hormones are of no therapeutic benefit; I personally have never used them.

Occasionally the hyperplastic breast tissue may become infected. The breast area will be hot, reddened and under tension. The infant may or may not have fever. He may have vomiting, diarrhea, anorexia. Therapy should be instituted immediately—antibiotics such as penicillin or possibly a wide-spectrum drug, warm compresses. If the area becomes fluctuant, incision and drainage are indicated. Incision should be made near the periphery in a radiating direction from the nipple and should be as small as possible to prevent scarring and retraction of the nipple and disfiguration, especially in the female child. Whenever possible, the surgeon should be called in consultation for the incision and drainage.

BREAST HYPERPLASIA IN EARLY LIFE—"PREMATURE THELARCHE"

Hyperplasia of the immature breast is not uncommon in early life. It is usually unilateral, tender and indurated. The most common age for this condition is three to eight years. It can occur even earlier, however. I am now observing an 8-month-old infant who has bilateral breast development, but is otherwise normal. Parents display concern over this condition. Since malignancy of the breast at this age is practically nonexistent, one must be selective if a consultant is considered. We try to reassure the parents chiefly, since the concern is mainly theirs, and watch the breast carefully at intervals of two to three months, making careful measurements. Removal of the breast should *not* be considered unless biopsies in a few areas are done. Then, if indicated, operation may be performed.

It behooves the referring physician to have a good working relation with his consultant. Too often a referral is made without any pre-

liminary discussion or "meeting of the minds" with the consultant. Too often a child's breast has been removed needlessly.

The *cause* is not known. The *treatment* is conservative observation over a period of years. Hormonal therapy is of no known benefit. *Surgery* is done if malignancy is proved. Most cases regress spontaneously.

PRECOCIOUS BREAST DEVELOPMENT

This may occur in infants and small children and is the first sign of precocious sexual development. The breasts seem especially sensitive to estrogens. For this reason they develop both in the young patient and in the maturing child before any other secondary sex characteristics. There are cases on record of a number of children between the ages of two and seven years who had general sexual precocity with breast development. Schauffler[1] cites the case of a 14-month-old girl who had breast development plus periodic vaginal bleeding which began at 12 weeks of age. She had general accelerated precocity. Some of these children have early, cyclic vaginal bleeding plus other well developed secondary sexual characteristics. Others have no menstrual flow, but do have sexual characteristics. The majority have so-called idiopathic or constitutional precocity, to the best of our present knowledge. One must rule out secondary causes for sexual precocity. This is best done by the combined efforts of gynecologic and endocrinologic consultants.

I personally would not manage these children except in consultation because the fears and psychic trauma to parents and child are too great to manage without expert advice. I would talk at length with the parents on the rather frequent occurrence of "constitutional precocious breast development." They should know that many of these go on to complete sexual precocity. I would discuss with them the need for normal age activity and companionship for the child, since the mental development does not keep pace with the sexual maturation.

GYNECOMASTIA OF THE ADOLESCENT MALE

Male mammary hyperplasia occurs frequently during adolescence. The etiology is not too clear, but it is thought that (1) estrogens may be secreted in excess by the adrenals or testes or (2) there is temporary disproportion between the secretion of the testicular androgen and the hypothetical hormone of seminiferous tubules, "inhibin." Histologically there is little hyperplasia of the ducts, but there is considerable increase in the periductal stroma.

The hyperplasia may be unilateral or bilateral. The breast enlargement may be slight or considerable and may persist for years. I have not seen any persist beyond two years, at which time there has been a rapid regression in the tissue. I have observed this phenomenon more in the Negro adolescent than in the Caucasian. The usual age of appearance in adolescents that I have observed has been in the 14- to 16-year age groups.

Boys become somewhat alarmed at this phenomenon and are reticent in consulting their parents. The boy may be brought to the physician's office by the parent without the parent's knowledge of the reason for the visit. The condition may have a psychologically traumatic effect on the adolescent boy. But, if one is patient and discusses maturation with the parents and the boy, they can be reassured and convinced that the future will bring normality. While explaining the complicated process of development I usually tell them about hormones and how they get a little "mixed up" during development and that the body must be given an opportunity to work out its balance. My advice is to "sit tight," no manipulation, prevent trauma, and the condition will regress. The time is variable—from a few months to one to two years. In the 10 years of my work with adolescents I have not had to refer any of my boys to a surgeon. All cases have spontaneously regressed. If the hyperplasia persists beyond two years, surgery for psychological or cosmetic reasons may be considered.

Pseudogynecomastia in fat boys is distinguished from true gynecomastia by palpating for breast tissue.

Although in the greatest number of cases gynecomastia in the adolescent is benign and one might say physiologic, the other causes must be ruled out. These are: (*a*) Klinefelter's syndrome, (1) gynecomastia, (2) small testes, (3) hyaline degeneration of seminiferous tubules, (4) azospermia, (5) increase in FSH; (*b*) hepatic disease; (*c*) severe malnutrition; (*d*) feminizing tumor of the adrenal (extremely rare in children and adolescents); (*e*) testicular neoplasm; (*f*) paraplegia; (*g*) exposure to small amounts of estrogens.

BREAST DEVELOPMENT IN THE MATURING FEMALE—NORMAL DEVELOPMENTAL PATTERN

Adolescence in the female is generally defined as the transition from childhood into a childbearing woman. Breast development precedes the appearance of all other secondary sexual characteristics by about one year. Adolescent development in the female ranges from 9 to 17 years, breast development appearing from 8 to 16½ years. If we assume the known average of the menarche as 13 to 15 years, a slight budding of the nipple becomes apparent at around the age of 10. After this, between 10 and 11, the breasts barely bud. At 12 to 13 the breasts fill in and the nipples become pigmented. This is a long-awaited event in the female. Most girls anticipate this development to such an extent that often a brassière is requested long before the mother notices any changes. I would advise the mother to purchase a beginner's "bra" if her child so desires.

The normal sequence of breast development has been briefly outlined. The wide variations that occur are due to such factors as (1) nutritional status, (2) genetics, (3) constitutional variations, (4) race or nationality, (5) endocrine pattern, (6) congenital defects, (7) illness.

When a girl begins breast development, despite the fact that she

has been anticipating this development, there is a tendency to stoop. I talk with the mother and the child, pointing out that this is an event for which she has really been waiting. She should be proud to be developing normally as a woman to fulfill her role in life. I discuss this phase of her development along with preparation for the menarche. It is pointed out that each generation must reproduce or our race would die out, and it is each girl's destiny in life to marry and become a mother. God has planned this and made man and woman a wonderful human body which surpasses any machine that we know. So, as we are approaching womanhood, certain parts of our body begin to grow and develop to fulfill their function of motherhood. The breasts are meant by nature to feed the infant. Therefore we should be proud to develop normally.

It can be pointed out that a number of women do not develop much breast tissue, and when this happens, women have always used padding to create an illusion of breast tissue. In modern times manufacturers have placed on the market padded brassières known as "falsies." It is wise to mention this to the child and show her the "falsies," thus doubly impressing upon her the pride she should feel in normal development and how important it is for her to maintain a normal, erect posture, especially at this period when her pelvic organs are developing. Charts and diagrams are useful in this discussion to show the relation of the abdominal organs and the effects of slumping or slouching.

"Bras" should be worn as soon as some breast tissue appears. It may really not be necessary, but it supports the girl's insecure feelings about growing up. She identifies herself with other adult females. Also the transition from a beginner's "bra" to one with good support is then a simple matter. The child will feel less embarrassment in being measured and fitted. Two brassières, one on and one in the wash, are an adequate supply, since the girl's size may change rapidly. All good department stores with teen departments carry an adequate line with women experienced in measuring and fitting. With development of breast tissue an uplift brassière with good support is essential. They come in different chest sizes and cup sizes for the various types of developed breasts (e.g. *Teenform* and *Maidenform*).

At times girls fail to develop any degree of normal tissue. This is a psychologic handicap, for as the girl grows into adolescence she feels "different" from other girls. Here, again, a discussion of how girls develop and an explanation that there are individual differences in many areas of the body help relieve the insecurity. Pictures of individual differences in breast development may be of value to impress on her the fact that she is only one of many.[2] This fact can be reemphasized again by showing her the "falsies." Since manufacturers place these on the market, there must be an appreciable demand or the item would not be worth producing. Two other strong points to help the girl adjust must be made. First, that with good "falsies" and a pleasing personality she will be as popular with the opposite sex as any other girl; secondly, that although the function of the breast is to suckle the baby, if the breasts do not develop during pregnancy,

artificial feeding of the infant is adequately developed, even for the severely allergic infant. Chest exercises help produce a fullness.

Occasionally one sees a child in whom breast development is extreme with large, pendulous breasts. This condition can be unilateral or bilateral and requires careful psychologic management. One must talk to both the patient and the parent. It can, for their purpose, be explained that the child's breast tissue is sensitive or allergic to the estrogenic hormone which starts circulating in the blood stream at the period of beginning rapid growth. They may be told that as soon as apparent growth ceases surgical intervention may be instituted to remove portions of the breasts and to construct a more normal type of organ. Consultation with a plastic surgeon is planned early, so that the child may see both her physician and the plastic surgeon for reassurance. The child's physician should follow her up every two months with measurements and discussion. The mother should be counseled about the type of clothing the child should wear in order to minimize the appearance of the enlargement. She may have to have these especially designed and made by a dressmaker. Loose hanging dresses without belts, smocks, capes rather than coats, may make the child feel more comfortable. Some type of support must also be designed by you and the dressmaker.

The above-mentioned deviations from usual are discussed from the standpoint of *normal* variations without any associated or causative pathology. We are assuming that these are taken into consideration by the practitioner with the help and advice of an endocrinologist or gynecologist as indicated. As mentioned above, the treatment is purely supportive and psychologic. No hormones are indicated.

SUMMARY

It is well to keep in mind that the breast tissue of both the male and the female child is sensitive to estrogens. Normal development in girls should be anticipated and discussed with the child and her parents. Deviations from the expected normal in infancy, childhood and adolescence should be approached as physiologic deviations. Cautious observation, with reassurance of parents and child, seeking consultation as indicated, is the most secure position. Hormones are not indicated in the treatment.

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MENARCHE AND MENSTRUAL PROBLEMS

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Menarche, the onset of menstruation, is a momentous event in a girl's life. Despite the fact that it is a normal milestone in her development, it is our duty, as physicians, to help prepare our young charges for the experience. To illustrate how important it may seem to a girl I recall a story which was related to me years ago.

Among the inmates in an institution for teen-age girls was one who had not started menstruation at age of 16½ years. The other girls soon learned of this and made remarks. One day Jane told the house mother, with seeming joy, that she had started her first period. This was such a long-anticipated event that the house parent prepared a party for that evening. The cake had initials, "B. G."—big girl. After the gay party had disbanded the house parent heard a rap on her door. She admitted Jane to her room. Jane burst into tears and asked forgiveness for her fraud. She had not started menstruating, but could no longer tolerate being different. With reassurance and careful management, she did become a "big girl" in a couple of months.

On the other hand, some girls are totally unprepared for the true meaning of the menarche. When menstruation does begin, the shock is so great that it may have a lasting emotional implication unless an understanding adult can ferret out the disturbance and help "talk it out."

ROLE OF THE PHYSICIAN

We physicians may take it for granted that in this enlightened age mothers know how to prepare their girls for the transition from childhood to womanhood. I have talked with groups of prepubescent girls, with mothers in attendance, and it is astounding how many mothers will come to talk to you after the session. "I did not know that," they say. So it behooves us to start preparing the mother for this important educational duty and be ready to supplement her instructions when necessary. This phase of education rightly belongs to parents, but physicians, ministers and adequately trained teachers should be able to assist the parents and/or assume the role of friend, instructor and confidante when necessary.

The greatest fault we physicians have, in the eyes of our patients, is that we are always in a hurry. This is also true of parents and of the world in general now. Many an adolescent finds no one with whom he can sit down and chat for a time, no one who will give him an opportunity to ask questions which are troubling him.

PRESENTATION TO PARENT AND CHILD

The manner in which you speak, the choice of your vocabulary and the information you give depend upon the child's mental maturity and her needs. For example, if a mother of a 9-year-old girl who is going to a mixed-age-group camp for two weeks asks your advice, it would be much simpler and far less detailed than it would be if the girl were 14 years of age and not yet menstruating.

The degree of physical, social and mental maturity is to be considered when counseling. You, as the child's physician, know these factors in relation to this particular child and can gauge your instructions accordingly. Also, you know the relation between mother and child. If the child wishes conferences with you alone, you and the mother should respect her wishes. You must explain to the mother that this is a period when her child seeks independence such as she did when she was around two years of age. The mother must be understanding in order to maintain the respect and love the child has for her. The patient may also have some feeling of embarrassment with the mother. I usually begin my discussion along some such lines as the following.

You cannot believe that at one time you were only 18 inches long and weighed 6½ pounds, can you? You were even smaller than that at one time—a time about which I shall presently tell you. However, I first want to ask you a few questions and let you think about them. What is the smallest unit of any community that lives and works together? What is its purpose? Is the mother important to a family structure? How? What would happen to the human race if men and women did not marry and have children? One of the purposes for which God made us was to fulfill the beautiful function of having babies and a family. All His creatures reproduce in order to maintain their kind and to maintain a balance in the world. I am sure you have watched birds. Do you know that the members of some species of birds have the same mates throughout their lives? They may separate after the mating season, but they come together again at the next one. You may have seen a pet dog or cat give birth to her babies. The human being has a long time to wait to reach full physical, mental, emotional and social development before he or she is ready for marriage and a family. As I talk about these things you may not always understand, at least not clearly. However, as time goes on you may ask your mother and me more questions. You will understand better and better.

Here I discuss the various organs and their function, the make up of the body (cells, and so on) and lastly the hormonal system, diagramming on paper the ductless glands and their hormonal action. It is easy to tell the story simply and graphically. The child is vitally interested in this total explanation. We cannot take an isolated system and discuss that alone without touching upon the other related systems; thus the patient comes to understand the broad scope of function of the body.

Body Changes

From the general discussion of the endocrine system we lead into a discussion of sexual development and maturity. The earliest change, increase in nipple size, and then breast budding and breast development are mentioned. The reasons for these changes, the stimulation of the ovaries to estrogenic production by action of the pituitary, are discussed. About the time of the budding of the nipple there is also a change in the perspiration with an associated odor which the physician can detect while examining the child even before he notices the breasts. As the breasts are developing, changes take place in the ovaries and uterus. Pubic hair appears and then axillary hair. It must be explained that some girls may develop some hair around the nipples and a little on the face. Her voice may change a little with maturity. As the matters are discussed they give rise to questions which are appropriately answered.

The girl should know about the general body changes which occur—laying down of more fat tissue; broadening of the pelvis; general rounding of the body. I am firmly convinced that many girls and women experience premenstrual tension and emotional upsets, and I tell my girls that this may happen. I prefer to prepare them so that they will recognize the symptoms and learn to control themselves and continue normal activity. Some children may have fears related to the onset of menstruation. In this case one needs to confer carefully with the mother and clarify any misconceptions she might have.

Reason for and Onset of Menstruation

The actual *mechanism* of menstruation should probably be a session in itself, because the girl may have many questions. One can again start with a diagram, explaining each portion of the reproductive system. The physiology of menstruation is explained in simple terms.

The age at onset of menstruation varies from 11 to 16 years, although it can be as early as 9 and as late as 17 years normally. There is one case on record in which menstruation with sexual development was present as early as eight months and several between two and eight years of age. The girl should be referred to a gynecologist for investigation if there is still absence of breast tissue and menarche at the age of 16.

If you have been the girl's physician over the years, you have done repeated physical examinations and have ruled out an imperforate hymen. If she is a new patient, this should be done before the onset of menarche.

Care of Self

With hormonal changes the girl will be counseled to observe good rules of health: (*a*) care of skin and hair, (*b*) plenty of fresh air and sunshine, (*c*) exercise, (*d*) good diet, not overeating, to prepare her-

self for motherhood and maintain good health during this period, (*e*) proper clothing such as "bras," (*f*) frequent bathing, (*g*) use of deodorants—many good ones are on the market. In anticipation of the menses she should have two sanitary belts on hand as well as a supply of pads. Most girls can start with the junior size. If this is inadequate, regular or super sizes are available. Two boxes should be kept, and when one is used, it should be replaced so that the girl will not run out. Suspants add more protection and security from "spotting."

I personally do not believe in internal vaginal protection. This is especially true if the hymenal orifice is small and tight. I have often wondered whether this did not predispose to a vaginitis or cervicitis. I do make an exception for girl athletes, especially swimmers, when they are to be in a meet.

It is wise to warn mother and daughter that there may be some degree of abdominal discomfort and a whitish vaginal discharge (leukorrhea) one to six months before the onset of menstruation. This may be present before each menstrual period. The mother should be warned that the girl may exhibit a degree of modesty around her, yet dress and undress freely in the presence of her girl friends. *Nothing* should be said to embarrass the child or make her resentful. The mother should be told to respect her daughter's privacy. She should tell her daughter how to wrap used napkins and where to dispose of them. She should also teach her daughter how to use a sanitary belt and tell her how often to change her pads. This should be four to eight pads daily, depending upon the flow.

The usual cycle is 28 days with 3 to 7 days' duration. This can vary in individual girls and may vary widely at the beginning of menses, sometimes 20 to 30 days with up to 10 days' duration. She and the mother should be aware of this wide variation of normal. In this age group the mother will often personally have to take the girl to task on caring for her skin and hair, bathing, using deodorants, and the like.

AMENORRHEA

The girl and her parents both must be counseled on *any* deviation from the normal. They should understand that several factors can cause amenorrhea, one reason being irregular ovulation. It must be explained that other factors such as severe emotional disturbances (death in the family, break up with a boy friend), changes (traveling), tension (anticipation of some social function), all can alter the cycle. Many girls do not establish a regular cycle for one to two years after the onset of menstruation. If the parents are too concerned, the physician should send the girl to a consultant in order to reassure them.

The physician must keep in mind the *other physical causes* of amenorrhea. The most common of these are pregnancy and pelvic inflammatory disease. By private consultation with the child and examination he can elicit a story of contact. Other causes may be organic ovarian disease, organic pituitary disease, thyroid disease, adrenal cortical virilism, Cushing's syndrome.

A consultant under these circumstances is always indicated. I would place the child under the specific specialist's care (parents' choice) with the understanding that I would also continue seeing her.

Anovulatory amenorrhea followed by prolonged bleeding generally requires no treatment. This condition can be explained to the parents as a normal deviation. Failure to ovulate while the proliferative type of endometrium builds up without the stimulus of progesterone may result in prolonged bleeding. I have seen several of these girls and instituted no treatment except reassurance, bed rest, ice bags, elevation of the foot of the bed, and all have established a normal cycle.

If the bleeding persists, hormonal therapy may be instituted or referral be made to a gynecologist or endocrinologist. I would prefer referral to using hormones, since the specialist can determine more adequately whether hormonal therapy is indicated and the type. Most endocrinologists and gynecologists are agreed that hormonal therapy is seldom necessary.

DELAYED MENARCHE

If a girl of 16 or 17 has not had the onset of menses, a thorough history and a physical examination are necessary in an effort to determine the reason. An evaluation of the bone age and knowledge of the general development of secondary sex characteristics is important in the total picture. This condition can simply be a normal physiologic variant, or it can be actually due to pathology, local or elsewhere. After ruling out local conditions and systemic diseases the girl should be referred to an endocrinologist if endocrine disease is suspected. The pediatrician or general practitioner can usually rule out local or systemic disease, but when in doubt, it is always wise to have a gynecologic consultant's opinion.

OLIGOMENORRHEA

Scanty menstruation is no cause for alarm if all other factors are normal. If it persists beyond age 16, the parents and the girl feel more secure if a consultant (gynecologist) sees the girl.

"Midmonth" staining from the period of ovulation to onset of the period may occur in adolescent girls without pathology except that there is a deficiency in estrogen. An explanation which one can give to parents is that the hormonal imbalance is generally righted by the body and that this is no cause for alarm.

MENORRHAGIA AND METRORRHAGIA

Other than anovulatory prolonged bleeding, which was mentioned previously, additional factors which must be ruled out are (1) blood dyscrasias; (2) poor nutritional status (this may be present even with good weight and growth, owing to teen-age fads of eating and dieting);

(3) tumors such as granulosa cell tumor of the ovary, polyps; (4) foreign body in the cervix; (5) emotional factors. Any child in whom a tumor is suspected should be seen by a qualified consultant. This saves time and money for the family.

THERAPY

As for therapy for menstrual abnormalities, the best policy is to do little. Supportive measures such as bed rest, ice bags, and elevation of the foot of the bed for prolonged bleeding may be of value. In severe dysmenorrhea I have used Daprisal (S.K.F.), 1 tablet morning and evening for 3 days before onset of menses. Acetylsalycilic acid or A.P.C., bed rest and a hot water bottle may add to the girl's comfort. For premenstrual tension, if a girl actually needs some help in addition to reassurance, I have used Thorazine in 10-mg. doses each night and morning or phenobarbital. Cytran (Upjohn), 1 tablet daily 5 days before onset of menses, may be of help. Curettage is seldom indicated and should be done by the gynecologist or endocrinologist. Pelvic examinations should *rarely* be done. A bimanual rectal examination is of great value at times. Hormones which are sometimes used include progesterone, estrogen and testosterone propionate. Thyroid is used *only* in hypothyroidism.

SUMMARY

We must consider that the menarche is a *normal* but *crucial* time in every girl's life. *Physical* changes should be explained and thoroughly understood by the child. *Religious* and *social* aspects of her development have a prominent place in her total instruction. The *emotional* implications connected with the normal and normal deviants should be anticipated by the prepubescent girl's physician. *Sex* as such has not been mentioned, but these are instructions which you are giving to a female who, in contrast to the male, has been cognizant of sex since early childhood. The influence you exert will be rewarding if you have the confidence and respect of your patient.

APPENDIX

Books and Pamphlets for Girls

A Story about You; by Marion O. Lerrigo, Helen Southard and Milton J. E. Senn (4th printing, 1959) 50¢
Available from: American Medical Association
535 N. Dearborn St.
Chicago 10, Ill.

N.E.A.
1201 - 16th St., N.W.
Washington, D.C.

Being Born; by Francis Bruce Strain
$2.50
Available from: Appleton-Century-Crofts, Inc.
New York City

Finding Yourself (Junior high age)
50¢
Available from: American Medical Association
535 N. Dearborn St.
Chicago 10, Ill.

N.E.A.
1201 - 16th St., N.W.
Washington, D.C.

For Girls Only: The Doctor Discusses the Mysteries of Womanhood; by Frank H. Richardson
(1953) $2.50
Available from: Tupper & Love, Inc.
1090 Capital Ave., S.E.
P.O. Box 5109
Atlanta 2, Ga.

Girls Grow Up; by R. Fedder
Available from: McGraw Publishers

Growing Up; by Karl DeSchwernitz
$1.95
Available from: The Macmillan Company
60 Fifth Ave.
New York 11, N.Y.

Pamphlets

About Growing Up
Very Personally Yours
Young Teens Talk It Over
You're a Young Lady Now
All available from: American Social Health Association
1790 Broadway
New York 19, N.Y.

Films

Human Growth; by Eddie Albert
Available from: State Board of Health

Human Reproduction; by McGraw-Hill
Available from: State Board of Health

Secret of Life; by Walt Disney
Available from: State Board of Health

The Story of Menstruation; by Walt Disney
Available from: Education Director
Kimberly-Clark Corp
Cellucotton Div
Neenah, Wis

Roman Catholic Publications*

A Girl and Her Teens: A Positive Program for Teen-Age Girls; by Father Peter Thomas Rohrbach
Publisher: Bruce Publishing Co.
Milwaukee, Wis.

Growing Up: A Book for Girls; by a Catholic woman doctor
(1946)
Publisher: Benziger Bros.

Mother's Little Helper: 12 Heart to Heart Talks of a Mother to Her Daughter
Publisher: Franciscan Herald Press
1434 - 51st St.
Chicago 9, Ill.

Parents, Children and the Fact of Life; by Henry V. Sattler
Publisher: Image Books
Doubleday & Co.
Garden City, N.Y.

Tips for Teens; by Alvena Burnite
(5th printing, 1959)
Publisher: Bruce Publishing Co.
Milwaukee, Wis.

Books and Pamphlets for Parents

Understanding Your Adolescent; by B. S. Gottlieb
Available from: Rinehart, Clark Irvin

Garden of Babies; by M. U. Beiler

Please Tell Me; by R. Andy and E. E. Andy
Available from: Wake-Brooks House
Sanbornville, N.H

Facts Aren't Enough
50¢
Available from: American Medical Association
535 N. Dearborn St.
Chicago 10, Ill.

N.E.A.
1201 - 16th St., N.W
Washington, D.C.

3307 Mt. Rainier Drive
R.R. #1
Louisville 7, Ky.

* Available at Roman Catholic stores or through publisher.

EMETICS IN ACCIDENTAL POISONING

WILLIAM CURTIS ADAMS, M.D.

The clinical use of emetics has been subject to much controversy. Some of the controversy results from the inherent danger of these drugs and some from their inappropriate use.

When used, an emetic must be chosen for its rapidity of action, effectiveness, safety and availability. Their most common use is to rid the stomach of unwanted and often dangerous substances. A common abuse is to use an impotent, slow-acting emetic in circumstances demanding prompt results.

More than five years' experience in poison control work has emphasized the importance of immediate removal of accidentally ingested substances which are potentially harmful to a patient. A common-sense approach to the problem has been developed as a result of these experiences.

The greatest number of inquiries directed to the private physician about accidental poisoning come to him by telephone. Practical first aid is important. With few exceptions, this means giving instructions about making a patient vomit. Emetics obtainable only at a drug store can be of little value then. It is easier to induce vomiting if the stomach is full rather than empty. Water is the most readily available and safest substance with which to dilute the poison and fill the stomach. One cannot proceed beyond directing the following steps: (1) the use of water as a diluent, (2) insertion of a bite block between the teeth, (3) positioning the patient in a head-down position, (4) using a finger in the back of the throat to stimulate gagging.

If available, WITHOUT DELAY, mustard water (1 to 2 teaspoonfuls of powdered mustard per glass of warm water) or a warm hypertonic salt solution (1 tablespoonful of table salt in glass of warm water) may be given in quantities sufficient to help stimulate vomiting by local irritation in the stomach. When used in this manner, these substances must merely replace step number 1 above and cannot be considered a substitute for steps 2, 3 and 4.

The tremendous variability of the human gag reflex has far too often prompted dependence upon emetic preparations alone. Syrup of

ipecac is slow-acting (30 to 60 minutes). It is mentioned only to discourage its use in accidental poison ingestion.

In physician's offices or in the hospital emergency room, copper sulfate (0.25 to 0.5 gm. per 100 cc.) or zinc sulfate (1 to 2 gm. per 200 cc. of water) can be used. However, it would probably be a mistake to take the time to mix those solutions rather than simply taking the immediate measure of diluting by giving large amounts of water.

Apomorphine, although undeniably the most potent emetic, creates such a severe central nervous system depression that its use is generally considered contraindicated.

The recent introduction of numerous pharmacologically active antiemetics has created a special problem. Attempts at creating emesis with emetics in patients who have taken the various antiemetic substances can generally be considered a waste of time. These patients should have their stomachs washed out as soon as possible.

The relative effectiveness of lavage versus emesis in emptying a stomach is still a debated question about which much opinion is expressed and little fact is known. The emergency at the other end of the telephone leaves little time for questioning in most cases. Even here, however, certain definite contraindications to emesis do exist: (1) as suggested above, after ingestion of an antiemetic; (2) for unconscious or convulsing patients; (3) for those who have ingested corrosive substances; (4) for those patients who have ingested liquid petroleum products or similar hydrocarbons; gastric lavage is here preferred.

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ANSWERING PARENTS' QUESTIONS

WILLIAM G. CROOK, M.D.

Changing Responsibilities of the Child's Physician

Whether you are a pediatrician or a general practitioner, your job is changing. And it's getting bigger all the time. Whether you finished your medical training last year or 40 years ago, you must constantly equip yourself with new knowledge and skill to meet adequately the medical needs of America's bumper crop of children.

Many of the medical problems which confronted the family doctor 20, 40 or 50 years ago have vanished. Diarrhea, pneumonia, tuberculosis, malnutrition, rickets and scurvy, which were prevalent a generation ago, are no longer a problem to physicians in most regions of the United States. Although these and many other diseases have been controlled or wiped out, their disappearance has only allowed us to see more clearly a whole host of unmet problems surrounding us. These new challenges have been recognized by many thoughtful observers[7, 9, 14, 18, 19, 33, 36] and most physicians who give medical care to children. They include emotional and psychiatric problems, allergy, handicapped children, juvenile delinquency and accident prevention. As we review this list, we see that all these topics lie more in the realm of prevention than in that of treatment.

The term "preventive medicine" has been an accepted part of medical teaching and concern for many decades. There are a number of different levels of prevention. We can prevent something bad from getting worse; or better still, we can prevent something bad from getting started. More important, in our present concept, preventive medicine is thought of in an even more positive way—that of promoting the good. Shaffer[33] suggested the term "constructive medicine" to apply to the type of systematic health supervision a child's physician should furnish to his charges. He emphasized the importance of a positive

approach to child health which would lessen the incidence of both physical and mental problems. Many others have also emphasized this point of view.

"Health as a state of physical, mental, and social well being, not merely the absence of disease or infirmity," is a definition more widely accepted by the medical world.[20] "All things affecting the physical and mental health of children are of concern to the physician."[23] "An overly anxious mother may be as much a health hazard to a child as a tuberculous mother."[21]

The Doctor's Dilemma

Pediatrics is truly a new kind of specialty. The pediatrician of today and tomorrow, rather than resembling the proverbial specialists who know "more and more about less and less," must accept the challenge to know "more and more about more and more." He must be able to manage the healthy newborn infant and counsel the parents; he must be able to recognize and competently treat the many disorders of the neonatal period in both full-term infants and prematures. He must be competent in recognizing and treating infectious diseases, allergy, congenital defects and malformations, metabolic disorders, nutritional disturbances, neoplastic diseases, problems of fluid balance and countless other conditions which occur in children. At the same time he has to fulfill his obligations in preventive and constructive medicine, including especially accident prevention and the prevention and management of emotional and behavior problems and the reassurance of parents. Several recent surveys indicate that it is in this last-mentioned area of responsibility that the pediatrician feels his greatest inadequacy.

Pediatrics—rightly or wrongly—has gained the unenviable reputation of being medicine's most frustrating specialty. Many pediatricians have given up the struggles of practice and have gone into academic medicine or taken a salaried administrative or technical position. What to do about pediatrics and pediatricians has been discussed extensively in the past several years. Among the solutions suggested are the following:

1. Train all pediatricians more intensively to serve as consultants, leaving generalists to do the routine care of children;
2. Create two classes of pediatricians, one of them to be superspecialists, the other to be of lesser caste to look after the run-of-the-mill nervous mothers, feeding problems and runny noses;
3. Abolish pediatrics as a specialty and, as with geriatrics, combine it with internal medicine;
4. Continue the present system, but make it more attractive.

To me, the last of these four solutions is the only one which merits serious consideration. Since most of us can't afford to give up our practices and change to another specialty, it's up to us to re-evaluate the jobs we have to do.

The Doctor as a Teacher

Just what are our jobs as physicians? To put it one way, we are peddling health. Parents bring their sick children to us to be made well and their well children to be kept well. How do we, as physicians, accomplish these ends? We give medicine such as antibiotics which help fight or arrest an infection. We give other drugs, such as insulin and thyroid, to help alter abnormal body conditions. We give injections to prevent our patients from getting poliomyelitis, diphtheria, whooping cough and tetanus. These methods of treatment and prevention to a trained physician are no great problem. If a mother will bring her child to our offices for an injection or will cooperate by administering medicine, many of our treatment and prevention problems are solved.

Unfortunately, this isn't our whole job. There is no injection which will teach Susie the facts of life. There is no obedience pill for the two-year-old who won't mind. There is no safety ointment that we can rub on the toddler to keep him from drinking oil of wintergreen. There is no magic elixir for the allergic child who "keeps a cold." Finally, there is no pill or injection which will satisfactorily help an anxious mother to handle what often seems to us to be a minor problem. Most pediatricians see dozens of such patients every week.

What, then, can we do? How else can we change the state of health of our little patients who come to us for help? The answer lies in our ability to do yet another job—education. We have to tell the parents about many things; we have to influence their minds; we have to TEACH.

Perhaps we are only really getting back to fundamentals. We find that the Latin word *docere*, from which "doctor" is derived, means "to teach." The child's physician of today must teach whether he likes it or not. But before we can teach mothers we have to find out what they wish to know. Korsch's[23a, 23b, 23c] recent detailed and thought-provoking reports describe scientific principles and techniques in the field of psychosocial pediatrics which, if acquired by the average pediatrician, could do much to help him do his work more skillfully and, at the same time, make it more fun. Since an estimated 60 to 80 per cent of the pediatrician's time is spent in talking to parents, acquiring some of these skills in interviewing and observing parents would seem of utmost importance.

Assuming that you have found out some of the things the mother wants to know, maybe you can satisfactorily solve her problems with a smile and a word or two of reassurance. Or possibly you may feel that there are a lot of things the patient doesn't need to know. Maybe you feel that there is too much in the press and lay magazines on the subject of health. There is certainly some merit to this point of view.

Nevertheless in our changing world, medical information through nonmedical channels is a development of modern life which is here to stay, and I believe that the trend is a good one. The educated and well informed patient can better cooperate with you and follow your instructions. Increasingly, parents want to know more. Their thirst for

medical knowledge is insatiable. One of the chief indoor and outdoor sports of the modern mother is discussion, over the bridge table or across the back fence, of her child's health problems. It is a rare daily paper which does not have some article by a syndicated columnist on child rearing and the treatment of disease. You can scarcely spend an evening in front of your television set without seeing a program on a medical subject.

The parent of today has grown up in an age when people talk uninhibitedly about many medical problems that were almost, if not quite, taboo in polite society only a generation ago. In addition, not a month goes by without a drive conducted with full Madison Avenue technique, telling the parent about poliomyelitis, cerebral palsy, cancer, mental health, multiple sclerosis or heart disease. The medical profession has officially acknowledged its responsibility to inform the public by participating in public discussions at community centers, over the radio, on television, or through speeches to various service clubs.

The need for leadership and counsel from within the medical profession in the matters of health information has been acknowledged by those aware of these recent trends.[4, 10–13, 15, 17, 27, 31, 37] Parents anxiously seek a dependable authoritative guidance as a relief from the profusion of conflicting advice.

The information summarized above leads us to the following conclusions: If, as physicians, we wish to maintain our position of leadership in the health care of our patients—if we wish to be "captain" of the health team, we must properly instruct our team members. Although there is no substitute for warmth, empathy, acceptance and personal reassurance by the physician, you can supplement and broaden your health teachings by utilizing carefully selected books, pamphlets and mimeographed instruction sheets.

A mass of such materials is available to the practicing pediatrician. In the remainder of this article I shall outline and describe how you can organize and use some of these materials in your own practice.

AREAS OF A PEDIATRIC PRACTICE IN WHICH EDUCATIONAL MATERIALS CAN BE USED

Well Child Supervision

This includes helping parents to live with and understand their children; interpreting to them normal growth and development, including variations within the normal range; helping them learn what to expect of their children and giving them reassurance as indicated. Included also are dietary advice, preventive mental health, accident prevention, allergy prevention, sex education and health protection in general.

Management of Specific Problems and Deviations in Well Children

This group includes conditions whose frequency (if not severity) demands special attention by the physician. In addition, the understand-

ing and cooperation of the parents are a "must" if satisfactory results are to be obtained. This group may be subdivided into several sections:

a. Anatomic and functional problems such as the protruding navel, "enlarged" tonsils, the tearing eye, innocent heart murmurs, colic, bowlegs and constipation

b. Psychologic problems such as feeding, discipline, sleep problems, breath-holding, temper tantrums, night terrors and masturbation

c. Common diseases and miscellaneous deviations from the normal, including measles, mumps, chickenpox, colds, sore throats, acne, enlarged glands, "keeping a cold" and other early symptoms of allergic disease.

Diseases and Other Abnormal Conditions

This applies especially to those which have a prolonged course and an uncertain outcome. The parent may have to live with many of these conditions for weeks, months, years or even for life. Typical examples are congenital defects, convulsive disorders, mental retardation, diabetes, rheumatic fever, asthma and other allergies.

The successful treatment of most of these chronic conditions depends on the understanding, knowledge and active cooperation of a parent. Without such a partnership with the parent the physician's best intentions and most skillful work may be fruitless.

SETTING UP A PARENT EDUCATION PROGRAM

Parent teaching materials are like clothing: you can make your own or you can obtain them from others. If those you can get from others fit well, you can use them; if they don't, you must discard them and look elsewhere. Or you can create your own. The instructional materials used by my associates* and myself are a combination of both types.

An instructional program for your patients can be started very simply. Like many physicians you may already use some teaching aids in your office. These may include printed sheets on "How to use nose drops," "Managing your acne" or "Treatment of diaper rash." These and many others are available from the detail men. But instructional materials also can be compared to drugs; you can use only those you are familiar with. Furthermore, *you can use them only if they say what you want them to say* or fill the specific purpose you desire.

Many potential teaching aids come across your desk every week. These include the beautifully illustrated folders and booklets, as well as the newspapers and other promotional materials of the ethical drug companies. Popular magazines and daily newspapers contain much

* Even in our group of 4 pediatricians we vary a great deal in the degree to which we use these materials. Two of us use them a lot, but the other two use them very little. This is why, in this article, I shift the pronouns used back and forth between "we" and "I."

health education material written in terms that patients can understand. Also there are numbers of books and pamphlets on health topics available for purchase by you or your patients. Some can be obtained free. The abundance of this material creates another problem of its own. You are literally swamped with it, and to keep your office and desk from becoming covered up you may throw the free stuff away and refuse to buy the rest.

It is obvious, then, that to use any type of educational materials effectively, you must organize them. Although you can do this gradually over a period of time, this is the hard way. If you are really interested in setting up such a program, I would suggest that you take time out to catalog and systematize the material.

Parts of a Program

There are six main ways of teaching parents, besides office visits and conferences. The first three of these can be easily put into operation by any practicing physician. The fourth requires a little more time and expense, and the last two would require considerably more effort and organization. These six methods of parent instruction are the following:

1. Lending library
2. Folders and notebooks
3. Pamphlets
4. Mimeographed sheets
5. Group conferences
6. Films

LENDING LIBRARY. You can set up a well stocked lending library for 50 dollars more or less, depending on how complete you want it to be. The saving of your time and the appreciation of your patients will more than repay you for this outlay in a short time. Most of the books which my associates and I have found useful in our library cost only a few dollars. Some were as little as $1.50, and the average cost hasn't been over 3 dollars. Recently we have added a series of pamphlets to our lending library. The cost to us of these pamphlets isn't high—40 to 60 cents. The parent can return the pamphlet after reading it. This keeps parents from feeling that we are forcing an added expense upon them and would be particularly important if they happened *not to like* the prescribed pamphlet. Our lending library has proved most helpful on the following subjects:

Adoption	Child guidance
Allergy*	Feeding problems
Sex education	Mental health
Adolescence	Preparing the child for hospitalization

It goes without saying that you must at least scan these books yourself before you prescribe them for your patients. Ideally, you should read them all carefully. The opinion of a trusted patient will also help you evaluate a particular reference.

Getting library books back isn't easy. We learned this lesson the hard

* I have collected and bound into book form a sizable volume of allergy parent instructional materials. Included in this "book" are the mimeographed sheets on allergy I wrote for my own patients as well as pamphlets and leaflets I have obtained from other sources, such as the Allergy Foundation of America.

way. Human nature being what it is, we had to put a penalty on overdue books to keep our library intact and our books circulating. Also, the presence of a penalty helps keep us from pushing books into the hands of parents who are not really interested. Such a parent will often be prompted to say that she will take out the recommended book later, rather than risk incurring the fine.

Setting up a system of checking books in and out, charging for overdue books and so on isn't as simple as it sounds. Actually, we tried several different ways of handling the matter before settling on our present method. Its provisions can be best illustrated by reproducing a copy of the mimeographed sheet on lending library organization and rules (see Table 15). We post these rules on the bulletin board, and a mimeographed copy of them is pasted inside the cover of the book.

The parent signs in a large notebook for the book she is *borrowing*. (We have found this method simpler than library cards). The columns of the notebook are as follows:

Title	Patient's Name	Clinic No.	Date Borrowed	Date Due

Our evening receptionist, by checking the notebook once a week, can see at a glance which books are more than 15 days overdue. The cost of the overdue book plus 50 cents is then added to the patient's account. A replacement copy is obtained from a local bookstore. This system helps us keep our books circulating better. Furthermore, we don't have the problem of nagging our patients to get them back. This avoids a possible source of friction between us and our patients.

TABLE 15. *Children's Clinic Lending Library*

Our Lending Library has been set up to help you.

Admittedly, no book can ever tell you exactly what to do for your child in a particular situation. Nevertheless, reading can furnish you information which will give you a better understanding of your child. With such an understanding, your job is often made easier.

To help you use our library and understand how it works, we have established the following rules to go by.

Your suggestions, help and cooperation are invited.

LENDING LIBRARY RULES

1. No charge is made for borrowing books and booklets.
2. They are loaned for 7 or 14 days as specified.
3. Please return them promptly so other parents can use them.
4. Books and booklets must be signed out by the receptionist before they are taken from the clinic.
5. When a book or booklet is returned, it must be checked in by the receptionist. *Please make sure you are given credit for returning it;* otherwise you may be charged for it.

PENALTIES

For Overdue Books:

1. 1 to 14 days overdue—a fine of 50c is assessed when you return the book.
2. 15 days and over—we simply sell you the book at the regular price listed inside the front cover. You keep the book. We add the charge to your account.

For Overdue Booklets:

You keep the booklet. We add a charge of 75c to your account.

Interestingly enough, few books are now kept overdue. Those parents who "bought" a book in this manner, almost without exception, have graciously and with good humor said something on the order of, "Oh, well, I really needed that book in my own library anyhow!"

FOLDERS AND NOTEBOOKS. My second method of parent instruction is by the use of folders and notebooks. Duplicating this system in your own office should be simple and inexpensive. The notebook and folder idea is one that I got from Dr. Luther Beazley and Dr. Bill Wadlington, practicing pediatricians in Donelson, Tennessee.

There is nothing mysterious or complicated about the notebooks. Two main types are available—the ring binder type which costs 25 cents to 1 dollar each, and the more compact, flat type of notebook or folder which costs 10 to 50 cents each. Whenever you see a picture, chart or illustration, or read something which expresses simply and clearly a point about child health which coincides with your own thinking, you (or your aide) can add it to your collection. The drug company publications contain especially beautifully colored illustrations. Helpful articles and other itsems also can be found in the daily newspapers, the medical newspapers and in such periodicals as *The Reader's Digest* and *The Ladies' Home Journal.*

Once articles have been clipped, their storage and preservation, especially single sheets or small clippings, can be greatly facilitated by placing them between sheets of clear plastic and inserted into the notebook. These sheets can be obtained from most stationery stores for about 15 cents each for a double sheet. Bulky materials such as long articles or pamphlets can be inserted in the notebooks "as is" by punching appropriate holes along the edges of the pages. (We use a regular "3-hole" puncher for this.)

As your collection of the materials in the notebooks grows (and it doesn't take long), you will find that you need to sort and classify it. New materials will be added and what is obsolete or doesn't fit into your program will be removed. At present I have about 20 notebooks. Most of these contain material on a single subject, although three of them are used for miscellaneous and unclassified materials. The notebooks that I use the most include the following:

Appetite and diet literature	Allergy (2 notebooks)
Bed wetting	The tonsil problem
Tuberculosis and histoplasmosis	Birthmarks
Ear trouble	Children's feet and shoes

A few of these notebooks contain only five or six sheets. Others, especially the ones on allergy and miscellaneous topics, have several dozen pages.

The value of these notebooks can be more clearly shown by telling you just how I use them. On many occasions, while examining a child or catching up on telephone calls, I will give the mother a notebook to look at. In this manner she is able to study the illustrations or read the instructions about a particular problem while she is in my consultation room. I never allow these notebooks to be borrowed or otherwise removed from the clinic.

Even more frequently, I use the notebooks in a little different manner. While talking to a patient about a subject or problem, I will pull out a notebook, using it briefly as a visual aid to help illustrate a particular point during my discussion and consultation with the mother. For example, in advising or reassuring a parent on the management of a strawberry birthmark, this system is simple but helpful. In my "Birthmark" notebook all I have is a mimeographed sheet and a couple of illustrated articles by Bivings[2, 3] on spontaneous regression of hemangiomas, showing how these birthmarks disappear if only they are given time. In a minute or so I can show the mother several illustrations of large hemangiomas which have spontaneously regressed. This helps in reassuring her and getting her to cooperate with me in a treatment program which consists of nothing but watchful waiting.

Most of the things in the two miscellaneous notebooks are less common problems or topics requiring perhaps only one or two bits of illustrative material. Included in these notebooks are perhaps a hundred different clippings I have collected in the past several years. Some examples of these are as follows:

1. A colored picture of a ragweed plant
2. A colored drawing of an exchange transfusion
3. Clippings from *Today's Health* and *Baby Talk Magazine* on such diverse topics as bad breath, moles, "braces" (orthodontic care), colic and jealousy
4. Pictures of rashes, including chickenpox, measles and other communicable diseases
5. Colored map showing the geographic location and distribution of histoplasmosis
6. Photocopies of the "allergic salute" and the "nose wrinkling" (the pictures of these characteristic mannerisms seen in children with allergic rhinitis were photocopied from an allergy textbook[16])
7. Newspaper article entitled "Have You Had Hepatitis?" from *This Week Magazine*. This helps explain to the patient some of the difficulties the physician may have in accurately diagnosing this condition. It also brings out the lack of any effective drug which can be used for treatment.
8. Article from *Time Magazine* quoting Dr. Robert Lawson on "Needless Child Doctoring," This little clipping gives me a consultant of professorial rank right at my elbow. This article is especially useful when I want to reassure a mother that her baby doesn't need his navel strapped or his tongue clipped.

The content of these notebooks can be made up to suit your needs and interests. Your office nurse can help you clip articles which are pertinent. I am constantly revising my materials. New articles or pictures are added, and those which are obsolete or do not fit into my program are discarded.

Before I set up a system of keeping these materials in notebooks, many loose clippings, drawings and charts that were irreplaceable were mislaid or lost. Although most of the time I could find the item I was looking for, in my search I looked like a rat terrier in a wood pile. And when I couldn't find what I wanted, my frustration and annoyance would be such that they were disconcerting to me and to the parents.

Pamphlets. There are innumerable pamphlets from many sources available to you. The principal ones my partners and I use are ordered from the Public Affairs Committee, 22 East 38th Street, New York 16, New York. Quantity lots of these cost about 17 cents. We sell them to the patient for the regular retail price of 25 cents. I store the most

commonly used pamphlets in my 30-drawer file under my auxiliary desk (see p. 366). We also have these stored in an accessible file immediately behind our receptionist's desk. They are "prescribed" and given to the patient at the time of an office visit, and a 25-cent charge is added to the patient's bill. In this way we know that they actually get the pamphlet. Also if the parent pays for the pamphlet, she is more apt to read it than if it were given to her.

The titles in this series that I use most frequently are listed below (those marked with an asterisk are bought in lots of 100). The "prescribing" of these pamphlets is almost as much a part of a patient's supervisional check-up as is skin testing for tuberculosis or examination of the urine.

Enjoy Your Child—Ages 1, 2 and 3*
How to Tell Your Child about Sex*
How to Discipline Your Children*
Understanding Your Child—6 to 12
3 to 6, Your Child Starts to School
How to Be a Mother-in-Law and Grandmother
Comics, TV, Radio and Movies
New Hope for the Retarded Child
Epilepsy, the Ghost is Out of the Closet
How to Help the Handicapped Child
The Modern Mother's Dilemma

A second group of pamphlets which we have found to be well written and helpful is put out by the Children's Medical Center, Boston 15, Massachusetts. These are written to take care of specific problems which may not be readily handled by the physician and for which other instructional material is not generally available. The subjects dealt with in these pamphlets include allergic disorders, rheumatic fever, adolescence, cystic fibrosis of the pancreas and mental retardation.

A third group of pamphlets which we stock regularly in our clinic is obtained from the Science Research Associates, Inc., 57 West Grand Avenue, Chicago 10, Illinois. There are at least 75 titles in this group which would be helpful to parents and to children in the preadolescent and adolescent age groups. These pamphlets are more expensive than the Public Affairs Pamphlets, costing us 40 to 60 cents each, depending on the quantities purchased. Accordingly, we have not sold or dispensed them, but, instead, have stocked copies of many of them in our lending library. These pamphlets come under three main headings:

1. Better Living Booklets: These booklets are for parents, and include such titles as "Building Self-Confidence in Children," "Helping Children Get Along in School." Booklets on special problems include "Fears of Children" and "Emotional Problems of Illness." For parents of older children and adolescents, the group includes such titles as "Pennies in Their Pockets" (helping children manage money), "Helping Children Understand Sex."

2. Life Adjustment Booklets: These are written for the high school age student and include an excellent group dealing with the following

general topics: job and career, getting along with members of the same sex as well as those of the opposite sex, making friends, emotional problems, and so on.

3. Junior Life Adjustment Booklets: This group is directed toward the junior high age students and includes topics of interest to these young people.

In addition to these pamphlets which we purchase either for resale to our patients or for loan to them, there are a host of other pamphlets available without charge to the physician from different sources. Among the pamphlets most useful which we regularly stock in our racks in the clinic are those from the following sources: The Ross Laboratories, The Equitable Life Assurance Society, John Hancock Life Insurance Company, Metropolitan Life Insurance Company, American Heart Association.

MIMEOGRAPHED SHEETS.* Producing one's own mimeographed sheets calls for investment in a mimeograph machine, or such sheets can be reproduced commercially. For the sheets I use, I put into simple and concise language certain instructions which, over the years, I found I have been called upon to give to parents.

These sheets are not used as a substitute for my verbal instructions to parents. Instead, they are used to supplement and make these instructions more complete. Less often do I have telephone calls from a mother the night after the office visit asking me how many days chickenpox is contagious or how much aspirin she should give her child with roseola or what to do if her child has another convulsion.

One of the principal advantages of drawing up one's own mimeographed sheets is that they say what *you* want to say. A partial listing of the titles of the mimeographed sheets I have in my collection is given in Table 16. A copy of two of these sheets is seen in Tables 17 and 18.

TABLE 16. *Mimeographed Instructions in Author's Collection*

GENERAL INSTRUCTIONS FOR WELL BABIES AND CHILDREN

Your New Baby
What Your New Baby Is Like
Breast Feeding
General information sheets on the following age periods:

1 to 3 months	Two and a half years
3 to 5 months	Three years
6 to 8 months	Four and five years
9 to 11 months	Six and seven years
12 to 15 months	Eight and nine years
18 to 21 months	Ten, eleven and twelve years
Two years	Adolescence

* Single or quantity lots of these mimeographed sheets are available. Address inquiries for price lists to the Children's Clinic, 648 W. Forest, Jackson, Tennessee. Also available is the bound collection of allergy instructional material.

TABLE 16 (*continued*).

SPECIAL INSTRUCTIONS AND PROBLEMS IN WELL CHILDREN

Acne	Histoplasmin Skin Test
Bed Wetting	Immunizations
Birthmarks	Murmurs
Bowel and Bladder Control	My Child Won't Eat
Child with a Limp	My Stomach Hurts
Colic	Protruding Navel
Constipation	Sleep Problems in Young Children
Diaper Rashes	Smallpox Vaccination
Discipline	Shoes for Babies
Emotions and Emotional Problems	Tearing Eye
Fears	Tonsil Question
Flat Feet	Tuberculin Skin Test

SPECIAL INSTRUCTIONS AND PROBLEMS IN SICK CHILDREN

Antibiotic Drugs	Lymph Nodes
Chickenpox	Measles
Common Cold	Mumps
Convulsions	Roseola
Ear Trouble	Sore Throat
Histoplasmosis	Throat Cultures and Sensitivity Tests
Infectious Mononucleosis	Treatment of Vomiting
Instructions for Treating Diarrhea	Use of Nose Drops

SPECIAL INSTRUCTIONS FOR ALLERGIC CHILDREN

Allergy History	Food Allergy
Allergy Prevention in the Newborn Infant	General Rules for the Asthmatic Patient
Allergy Prevention Measures	Helping the Allergic Child
Asthma	Notes on the Allergic Child
Causative Factors in Allergy	Recognizing the Allergic Infant and Child
Constitutional Allergy	The Allergic Nose
Directions for Maintenance of Dust-Free Room	The Allergy Seesaw

TABLE 17. *Shoes for Babies*

As a parent you are naturally interested in getting the right kind of shoe for your baby. Often you are confused by the different advice you get on the subject from family and friends. Enthusiastic advertising claims about special virtues of a particular brand of shoes add to your uncertainty. "Should your baby's shoes have hard or soft soles?" "When can you get low top shoes for him?" "Does he need corrective shoes?" "Can he go barefooted?" These and similar questions undoubtedly have occurred to you.

Your uncertainties on this subject are usually understandable because even among the "experts" there are differences of opinion.

This sheet is written in an attempt to clarify some of this confusion and to give you my own observations and recommendations.

For the infant with normal feet and legs:

1. Until he walks well, shoes as such are unnecessary. So you can leave him barefooted or can get him "booties" or soft cloth or leather shoes. STIFF SOLE shoes should never be bought for him until he has been walking for a month or two.

2. After he is walking he will need firm-soled shoes. Such shoes are necessary for walking outdoors on pavements, gravel and other rough or hard surfaces. Whether or not your child needs to wear these firm-soled shoes on hard floors in the house is a controversial point. Some excellent orthopedists and pediatricians feel that firm shoes should be worn at all times on hard floors. Others feel that going barefoot outdoors or indoors is not only permissible, but also actually desirable—if the child has *normal feet*.

(*continued*).

My own feeling is that *it probably does not make a great deal of difference if the child's feet are perfectly normal*. On the other hand, the many children who have mild to moderate degrees of flat foot (pronation) do need firm-soled shoes with some extra support on the inner side of the heel.

3. Opinions of the "experts" also differ about when you can get low-topped shoes for your child. High-top shoes would seem to have no value over low-cut shoes so far as support of the foot is concerned. Certainly there is no harm in wearing either high- or low-top shoes *if they fit*. So you can make your own decision.

4. Fluoroscopy should not be used in fitting your child's shoes because of the danger of excessive x-radiation.

5. Correctly fitted shoes should be one thumbbreadth longer and one little finger-breadth wider than the foot.

6. For the average child's foot any good, well built shoe is satisfactory.

TABLE 18. *The Three-Year-Old*

GENERAL. When your child gets to be three, things should be easier for you. Rearing a child at any age is no snap. Even so, you will find that managing and guiding a three-year-old is gloriously easy compared to the perversities and uncertainties that you faced six to 12 months earlier. The three-year-old can be reasoned with. He has learned to take turns. He may be able to share some of his playthings. He can play more cooperatively with another child, although considerable supervision is necessary. Bladder and bowel control is usually no longer a problem, although an occasional "accident" may occur when the child is busy playing.

FEEDING. Appetite is perhaps a shade better than it was a few months earlier. Many parents will continue to say, "My child won't eat," and feeding problems may arise or persist if you try to make him eat more than he needs or if you show too much concern over what he eats. Meats, eggs, milk, peas, beans, cheese, fish and other protein food constitute the principal growth foods. If he takes moderate amounts of these foods plus some fruit, you need not be concerned if he turns down many or all of the vegetables.

ACCIDENT PREVENTION. Your accident prevention obligations to your child gradually shift in direction as he grows older. It is common sense for you to continue to keep dangerous and poisonous things out of his reach as well as to protect him from other hazards both indoors and outdoors. Even so, you should now begin to teach him more about the dangerous things so that in the years to come his safety will become more dependent upon his own knowledge and education.

SEX EDUCATION. The three-year-old can ask more questions than a district attorney. Nothing is sacred. His curiosity about his own anatomy or yours is natural and wholesome. If his questions throw you for a loop, I would suggest you read Hymes's well written pamphlet, "How to Tell Your Child about Sex" (Public Affairs Pamphlet #149, 25¢).

ILLNESSES. The three-year-old's tendency to frequent colds, red throats and other respiratory ailments is frustrating for his parents. Many of these little illnesses are unavoidable and must be taken philosophically—especially when there are older children in the family who seem to bring the colds home from school to the younger ones.

We do not yet have a shot to prevent the common cold, and penicillin and the antibiotic drugs do not shorten its course. Some children, especially those with a tendency to allergy, may have their head colds "stopped in their tracks" by giving one of the antihistamine preparations at the sign of the first sniffle or sneeze. At any rate, it's worth a try.

REFERENCES. In previous generations the young mother learned what to expect of her child from her own mother, grandmother or older sister. Today many families are so scattered that mothers don't have this help available. However, scientific observations of thousands of normal youngsters by those interested in child development have helped us all to know what to expect of children in various ages. To learn more about how your child develops, you may find some of these references helpful:

1. *Baby and Child Care* by Spock (Revised edition, pages 357–380)
2. *Infant and Child in the Culture of Today* by Gesell (pages 202–223)
3. *Your Child Is What He Eats* by Lynch (Lending Library)

ARRANGEMENT OF MATERIALS IN OFFICE. The finest instructional materials in the world won't help you or your patient if you can't find what you want when you want it. Of course, each physician will need to work out his own system to fit his own office layout. Nevertheless, by seeing how I arrange these materials in my own office, you may be able to get some ideas that will help you in your own office.

In my consultation room I have an ordinary 30-drawer file built in under an auxiliary desk, immediately behind my swivel chair (Fig.

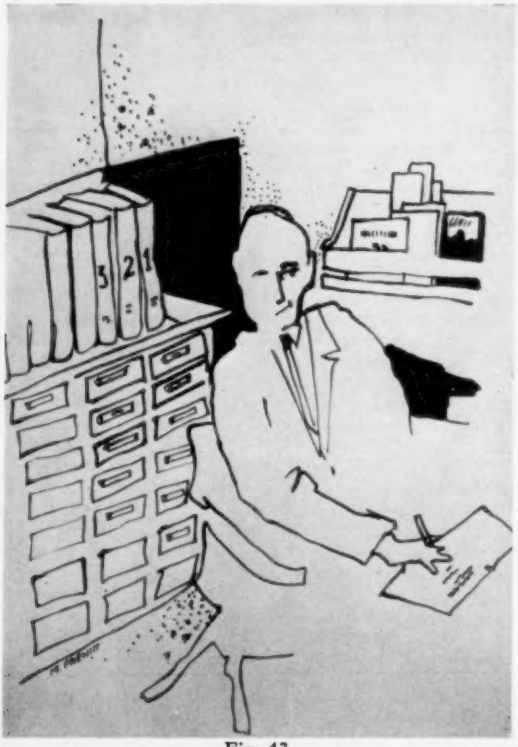

Fig. 43.

43). The drawers of this file are slightly larger than the average notebook sheets and are about 2 inches deep. In most of the drawers I have mimeographed sheets on four or five different topics. By using different colored paper for different subjects, no separation markers in the drawers are necessary. A few of these drawers are reserved for pamphlets. Through constant usage I can locate specific sheets in this file much as a typist or a musician can locate the keys of his instrument.

On top of my auxiliary desk the notebooks are arranged in order so that they, too, are within easy arm's length (Fig. 44).

Although I keep a small supply of the pamphlets I use most frequently in my own 30-drawer file, most of these pamphlets are kept in another 30-drawer file immediately behind the receptionist's desk (Fig. 45). The lending library books also are kept on built-in shelves which the receptionist can reach without leaving her chair.

The convenient location of the books and pamphlets enables our receptionist to check them out and record them in an orderly manner.

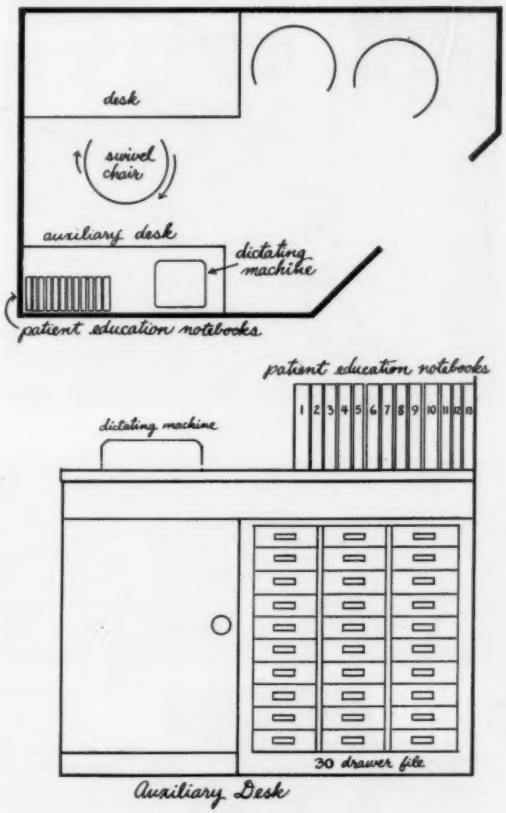

Fig. 44.

Keeping up with the less frequently used pamphlets and packets of material was the real problem for us for a long time after we had most of the other parts of our system pretty well worked out. The solution we finally hit upon is a simple one. Each drawer in the 30-drawer file is numbered from one to thirty. Then each pamphlet, in turn, is numbered. The prefix number for the pamphlet is the number of the drawer. The different pamphlets which go to a particular drawer are numbered consecutively. A copy of our pamphlet inventory and ap-

Fig. 45.

Fig. 46.

propriate code is kept in one of the notebooks on my auxiliary desk. A similar code is kept on the receptionist's desk. By using our intercom system or by giving the patient a note, I can have the receptionist check out a prescribed pamphlet when indicated. Before we worked this system out, we would turn the office upside down looking for a particular pamphlet or leaflet.

A final group of parent instructional materials is the "give-a-way" pamphlets and leaflets. These are stocked in bulk in our storage room and made available to the parents in two different locations. The first

Fig. 47.

of these is in a tract rack in the waiting room (see Fig. 46). Others are made available in racks in each of the examining rooms (see Fig. 47). The parent is free to help herself to any of these materials which interest her. One good feature about having these available is that it gives the parent something to do while waiting in either our general waiting rooms or in one of the examination and treatment rooms.

LISTING OF PRINCIPAL SOURCES WHERE MATERIALS CAN BE OBTAINED

Accident Prevention Committee, American Academy of Pediatrics, 1801 Hinman Avenue, Evanston, Ill. (San Jose, Calif. Accident Leaflets)
American Diabetes Association, 1 East 45th St., New York 17, N.Y.
American Foundation for Allergic Diseases, 274 Madison Avenue, New York 16, N.Y.

American Heart Association, 44 East 23rd St., New York 10, N.Y.
American Medical Association, Bureau of Health Education, 535 North Dearborn St., Chicago 10, Ill.
Child Study Association of America, 132 East 74th St., New York 21, N.Y.
John Hancock Mutual Life Insurance Co., Health Education Service, 200 Berkley St., Boston 17, Mass.
Kimberly-Clarke Corporation, Educational Department, Neenah, Wis.
Mental Health Materials Center, 1790 Broadway, New York 19, N.Y.
Metropolitan Life Insurance Co., Health and Welfare Division, 1 Madison Avenue, New York 10, N.Y.
National Association for Mental Health, 10 Columbus Circle, New York 19, N.Y.
National Association for Retarded Children, Inc., 386 Park Avenue, South, New York 16, N.Y.
National Cystic Fibrosis Research Foundation, 1616 Walnut St., Philadelphia, Pa.
National Epilepsy League, 130 North Wells St., Chicago 6, Ill.
National Institute of Mental Health, Bethesda 14, Md.
National Safety Council, Manager, Home Department, 425 North Michigan Ave., Chicago 11, Ill.
National Society for Crippled Children and Adults, 11 S. LaSalle St., Chicago 3, Ill.
National Society for the Prevention of Blindness, Director of Information Service, 1790 Broadway, New York 19, N.Y.
U.S. Public Health Service, Public Inquiries Branch, Washington 25, D.C.
U.S. Children's Bureau, Division of Reports, Washington 25, D.C.

SUMMARY AND CONCLUSIONS

The practicing pediatrician of today has a new and growing responsibility. Ideally, to do it adequately, he must practice constructive pediatrics. He must fulfill his obligations for the total health protection of the children for whom he cares. This includes not only periodic health appraisals, including a medical and developmental history, a physical examination, necessary laboratory work and immunizations, but also consultation with the parents. In these consultations with the parents the physician's responsibilities are:

To advise about feeding and explain nutritional needs, immunizations, any specifically recommended corrective procedures, accident prevention, and health protection in general.

To interpret what children are like, what is to be expected in normal growth, and where this particular child is in his development.

To give specific assistance in the management of behavior and the prevention of personality problems.

To plan required treatment and refer parents to appropriate services when necessary.

To help parents to be more capable and self-confident and to build good parent-child relations and promote family well-being.[22]

Trying to accomplish this in a 15- or 20-minute office visit is difficult. Passing out books, pamphlets and mimeographed instruction sheets is no panacea for accomplishing these objectives. As Korsch has clearly pointed out, the pediatrician can't adequately answer parents' questions unless he knows what lies behind the questions. To find this out, he must take time to listen to the parents, he must improve his skills in interviewing techniques, and he must try to assume a more accepting and unmoralistic attitude or else risk increasing the mother's feelings of anxiety and guilt. It is also important that the pediatrician *not* be misled

by the apparent intellectual interest of the parents in their child's illness and overlook emotional repercussions. Finally, he must consider the family's intellectual, financial, physical and emotional resources before working out a plan of treatment. If he can meet these qualifications reasonably well, the instructional materials described above may help him conduct his practice in a more effective and satisfying manner.

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OFFICE EQUIPMENT AND SUPPLIES

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For a large group the end of a residency means forsaking the protection of the ivory towers and the guiding hand, and beginning a new and independent life. This independence includes the providing of one's own facilities for carrying on a practice. When a young pediatrician is planning his office, he is frequently influenced by friends, family, and place of former residence. In many cases a location which is chosen in this manner is in a community with too high a ratio of physicians to the population. The struggle for existence in the first few years of practice may be complicated by inadequate opportunities to apply the recently gained knowledge and training. It would seem that some compromise solution is the better plan for the location of a pediatric practice. An area which is not too well served by pediatricians or one which is not overpopulated by general practitioners is more desirable. Nevertheless the presence of some friends or relatives will contribute to the newcomer's acceptance in the community. There are other influencing factors—desirable office space, good schools and homes, and the like. At any rate, once a location is chosen, an office will be necessary, and it is the goal of this paper to discuss certain phases of its equipment and supplies.

THE WAITING ROOM

Regardless of the type of office, an attractive, cheerful waiting room creates a first and lasting impression (Fig. 48). Seating space will be determined by available floor space and whether or not office hours are conducted by appointment. If the appointment system is used, less seating space will be required. Furniture for pediatric waiting rooms should be attractive, gay, colorful and almost indestructible. A personal favorite is that manufactured by the Herman Miller Furniture Company of Zeeland, Michigan. The molded plastic bucket chair made by this company should give years of service. The design of these chairs is timeless, the workmanship superior, the construction space-saving,

and above all they are economical. The chairs are made of plastic, plywood and wire, and are available in lounging and reading heights in dozens of shell and upholstery colors. Tables are topped with scratch- and burn-resistant hard plastic. These chairs can be obtained with wall-saver legs which prevent scarring the wall.

Adequate lighting should be provided, as well as some provision for hanging coats, umbrellas and hats. Sturdily constructed ash trays and smoking stands will be necessary items of equipment.

Attractive floor covering for the entire office will add much to its service as well as its appearance. Regardless of the type of furnishings

Fig. 48. Herman Miller Furniture Company chairs. These chairs are also available with wall-saver legs.

or of personal likes or dislikes, vinyl flooring will fit every need. Vinyl is famous for its outstanding wearing qualities and resistance to most common office floor hazards. It is relatively maintenance-free and may be kept in proper condition for many years with good cleaning and buffing. In recent years architects, designers and interior decorators have come to depend more and more on this type of floor covering when durability, styling, ease of maintenance, and economy are desired.

In decorating an office, consider the newer wall surfacings. My favorite is Vari-Krom (Vari-Krom, Inc., Hoboken, N.J.). Vari-Krom is a fascinating spatter paint with flecks of color built in and may be had in 20 exciting combinations of color. It is sprayed on and gives a texture which is tweed, mosaic, marble and pebble. Its spatter surface

resists soil and scratches and cleans easily with soap and water. It is a boon in the busiest areas which may need frequent cleaning.

The decorating of the waiting room, whether in paneling, wall paper or paint, should reflect the personality and the likes of the physician and not the decorator. Pleasant surroundings will do much to relieve the physical, mental and environmental fatigue of the harassed physician.

BUSINESS OFFICE AND RECEPTIONIST SPACE

Adequate space must be allocated to the receptionist and the bookkeeper in order for them to work efficiently. Storage space for business supplies is necessary. Over a period of time charts will increase in number, and space for future storage must be considered early if storage problems are to be avoided. Medical records in some states must be kept longer than in others, owing to variations in length of the statutes of limitations.

Adequate telephone facilities should be provided. Telephone company engineers are of great help in planning telephone installations and interoffice communications. Many new pieces of equipment have appeared within the past few years, adding much to the efficiency of the office. In a busy practice one unlisted telephone is worth more than the additional expense incurred in that it allows an open line for outgoing calls at all times.

THE CONSULTATION ROOM

The consultation room provides the physician a place for work, quiet reflection and informal meetings (Fig. 49). Here he can have a medical library, a desk for personal use, a private telephone, and space and furniture for more detailed and comfortable discussion with parents or patients. The preferred location is near the waiting room and close to the receptionist for the convenience of the patient. The consultation room, more than any other place in the office, should reflect the whims and fancies of the individual physician, for it is here that the few moments of rest and relaxation needed throughout the hectic day may be taken. If space permits, a private closet and private toilet facilities are desirable.

EXAMINING ROOMS

Pediatric examining rooms should not be too large if one is to make economical use of floor space and equipment (Fig. 50). In general, it would be better to have smaller examining rooms and more of them. In past years I have worked in examining rooms which measure 8 by 9 feet and have found them to be comfortable. However, in a new addition, to conserve space, examining rooms were reduced to 6½ by 8 feet, and these have been large enough.

One of the most important, but neglected, features of examining rooms is lighting. Many types of lights and lighting fixtures may be found. In examining rooms of the sizes previously described, fluorescent lighting fixtures, using six 40-watt, cool white, rapid-start tubes have been used. These are clean-cut modern fixtures with a highly efficient plastic diffuser of milk-white plexiglass, which provides excellent and uniform diffusion and low surface brightness.

In pediatrics the equipment and supplies in an examining room should be adequate to meet all occasions. Supplies, medication and equipment should be kept in some enclosure, safeguarding them from

Fig. 49. Consultation room. This room should reflect the physician's personal likes more than any other room.

the inquisitive patient. Examining tables of various shapes, forms and fashions can be obtained from any good surgical carpenter to meet all requirements. An adequate examining table is one that can be extended to full length for older children, or it may have a fold-down end to conserve space when not needed. The surface of the table should be covered with a waterproof, stain-resistant, easily cleaned material.

Storage space with cabinet and drawers under the table is a desirable feature. Built-in cabinets are most desirable from the standpoint of both economical use of floor space and expense (Figs. 50, 51). A simple and economical device is a so-called pass-through window, which may be constructed in the wall between two examining rooms. This

pass-through window may be used as storage space for small equipment such as tongue blades, thermometers, blood pressure cuffs. These windows have doors opening from each room allowing a conservation of supplies and equipment. Comfortable chairs should be provided for both the patient and the parent. Here again it is important to obtain a chair with the wall-saver leg. A small desk is also desirable in the examining room for the personal use of the physician. A real space saver is a small hanging wall desk which may be closed when not in use. These desks may be simply constructed to your specifications by a good carpenter. A floor type of gooseneck lamp is a useful piece of

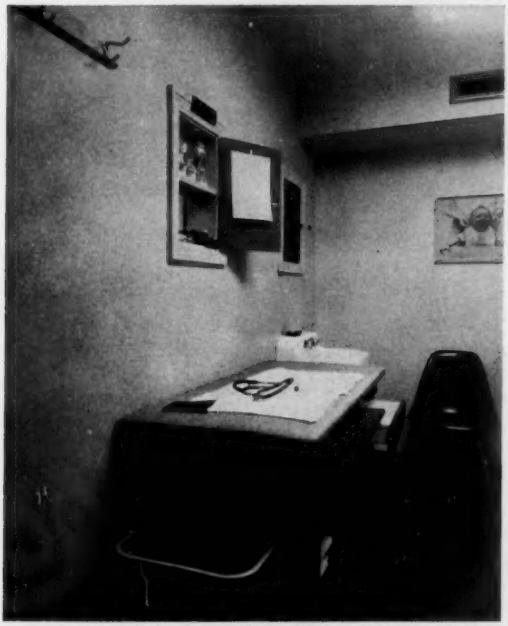


Fig. 50. Examining room, showing "pass-through" windows and cabinet space under the examining table.

equipment when additional light is needed. Provision must be made for weighing both infants and children. Each room may be equipped independently with scales, or some offices prefer a central weighing room if space is available.

A properly equipped examining room will be time saving and will prevent unnecessary steps to other parts of the office to obtain needed equipment. A suggested list of equipment for the examining room is as follows:

Stethoscope
Otoscope-ophthalmoscope combination
Blood pressure apparatus with varying-sized arm piece to include infant, children and adult sizes
Glass containers for cotton, tongue depressors, applicators, etc.
Thermometers, both rectal and oral
Metal applicators
Dull ear curets

Fig. 51. Examining room. Built-in cabinets and storage space save valuable floor space.

Nasal suction syringes
Neurologic examining kit
Transilluminator
Tape measure
Antiseptic solutions
Alcohol
Finger cots
Lubricant jelly
Band-Aids of various sizes and shapes
Silver nitrate applicators
Tuberculin patch tests
Disposable tissues
Urine bottles
Bedpan
Instruction pads
Prescription pads
Waste receptacle

When space permits, a separate examining room may be set aside for teen-age patients. In recent months a separate waiting room (Fig. 52) as well as a separate examining room has been set aside for this group. Both rooms have been furnished and decorated to appeal to the teen-age group. This has been done in an effort to overcome the resentment often shown by older children in seeing the "baby doctor." Such an arrangement should allow the pediatrician to move easily into the adolescent area and give more attention to the somewhat neglected problem of adolescence.

The number of examining rooms will, of course, be limited by the size of the practice and the amount of floor space available. A room which has a separate entrance from the outside can be utilized to good advantage as a contagion room. The mother who knows that such a room is available is not quite so reluctant to bring the so-called well child to the office for a routine visit. Wise screening by an efficient

Fig. 52. Reception room for the adolescent.

receptionist, who has been properly indoctrinated in the highlights of contagion, can usually separate one group from another when appointments are made.

EMERGENCY ROOM

The physician requires the tools and equipment necessary to practice his profession. His needs will vary considerably, depending upon the type of practice and his location. If the office is in close proximity to a well equipped hospital emergency room, duplication of these facilities in his office becomes a matter of personal inclination. But if such facilities are not available, then space, supplies and equipment must be provided for in the office. An adequate emergency room can be provided without great expense of space or equipment. Minimum equipment for the emergency room is as follows:

An *examining table*, preferably with drawers and storage space available (Fig. 53).

Suction apparatus. A water suction which connects to a water faucet is convenient and economical. X-Cel suction outfit with pump, tubing and suction tip may be purchased for approximately $6.50.

Available oxygen is a necessity, and a small *oxygen bottle* with mask may be obtained from a surgical supply house. Lif-O-Gen Emergency Oxygen apparatus may be purchased for approximately 7 dollars.

A *surgical kit* to include hemostats, needle-holders, scissors, scalpels, thumb forceps,

Fig. 53. Emergency room with a compartmental table which has equipment available for instant use.

and so forth. I have personally included tracheostomy tubes in this set in sizes 0, 1 and 2. Fortunately, in the past 10 years I have found no need for their use.

Suture material. A great variety of suture material is not needed in the average pediatric office. Braided silk, sizes 4-0 and 5-0 with attached needle, is used most often. Catgut sutures of the same sizes are occasionally required. Davis and Geck Company has recently supplied this surgical silk in small sterile plastic individual packs ready for immediate use. This has eliminated the bulky glass tube packaging of sutures.

One Cook-Waite *carpule syringe.* This is a syringe which dentists use for local anesthesia. The Cook-Waite carpule syringe is an excellent piece of equipment for the instillation of a local anesthetic in that it is much more efficient and easy to use than the ordinary Luer. There seems to be much less pain to the patient, owing to the fact that a much smaller needle is used. The needle is flexible and is not apt to break. This type of syringe may be obtained from a dental supply house.

Resusitube, pediatric and adult sizes (Johnson & Johnson Company, New Brunswick, N. J.), to serve as an airway or, if necessary, to be used in mouth-to-mouth breathing.

Telfa pads, sterile, 2 by 3 inches, manufactured by Bauer & Black. These sterile dressings prevent sticking and keep the wound dry. They may be cut to any size and shape desired.

Intravenous infusion setup to include 5 per cent dextrose and water, isotonic sodium chloride solution, Veno-pak disposable venoclysis set and a scalp vein infusion set. This equipment is manufactured by Abbott Laboratories of North Chicago, Illinois.

A floor type of gooseneck lamp for additional light
One metal applicator
One ear curet
One eye spade
One nasal speculum
One ear spoon and hook
One ear forceps
One splinter forceps

One stomach tube with bulb and funnel (Davol Rubber Company) for gastric lavage
Catheter tray
Spinal tap tray
Adhesive tape of assorted widths
Clavicle slings, canvas (Orthopedic Equipment Company, Bourbon, Indiana)
Bass wood splints for emergency splinting
Tourniquets
Emesis basin
Asepto syringe
Irrigation setup
Antiseptic solutions to include Zephiran and Merthiolate
Surgical dressings of various sizes and shapes
Roller gauze of assorted widths
Elastic bandages, 2-, 3- and 4-inch widths

One cabinet to contain emergency drugs. Drugs included are:

Atropine sulfate, 1/150-grain hypodermic tablets
Dermol hydrochloride, 100-mg. ampule
Nalline (narcotic antagonist), 2-cc. ampule (10 mg.)
Aminophylline, 10-cc. ampule (0.25 gm.) for intravenous use
Amobarbitol (Amytal) Sodium, ampule, 0.065 gm.
Pentobarbitol (Nembutal), injectible, 50 mg. per cc.
Aqueous epinephrine, 1-cc. ampules
Sus-Phrine, aqueous suspension of epinephrine 1:200 (Brewer & Co., Inc.)
Dramamine, injectible, 50 mg. per cc.
Calcium gluconate, 1-gm. ampule for intravenous use
Dextrose, 50 per cent, 1 ampule
Decadron, injectible (Merck), 4 mg. per cc.
Solu-Cortef, 100 mg., sterile, Mix-O-Vial (Upjohn)
Butyn, 1 per cent, to relieve blepharospasm
Fluorescein, 2 per cent, to demonstrate abrasions in corneal epithelium

A good otoscope-ophthalmoscope combination is essential. The Welch-Allyn set is a favorite because of its rugged construction and available accessories. These attachments include the sigmoidoscope, proctoscope, anoscope, laryngeal mirror and laryngoscope blades.

The chief complaint of rectal bleeding is a common one. For this reason the pediatrician should be proficient in the use of the anoscope and proctoscope, since many of these bleeding lesions can be detected and adequately treated in the office.

Every physician who deals with children will eventually be presented with a case of respiratory distress requiring visualization of the larynx or some form of intubation. For this reason the technique of using a laryngoscope should be learned early. Tracheal catheters passed blindly may in many cases do more damage than good. Intubation should be under direct vision for use on the smallest infant to the adult. The Foregger folding laryngoscope, being somewhat smaller, makes an ideal instrument to be carried in the physician's bag for immediate use. It is particularly useful in premature and newborn infants.

SYRINGES

Syringes constitute an important part of the commonly used office equipment. The introduction of the multifit syringe has led to a great time saving in the cleansing and sterilization procedures, and interchangeable barrel and plungers have reduced breakage cost considerably. Luer-Lok syringes are used exclusively with the exception of tuberculin syringes. The locking feature prevents embarrassing and troublesome accidents of having the needle separate from the syringe during injection.

Nilsson and Sisson[1] in a discussion of serious penicillin reactions state that contamination of syringes is one of the most frequent hidden sources of penicillin exposure and is one of great clinical importance. Syringes or the water used in sterilizing solutions may account for the contamination. For this reason syringes used in administering penicillin are kept separately, washed separately and autoclaved separately. Syringes used in administering immunizations and skin testings are handled in a like manner in an effort to prevent sensitization if possible. (See also page 387.)

Sterile disposable syringes manufactured by Becton, Dickinson & Company (Rutherford, N.J.) are in limited use in the office, but are a useful addition to the physician's bag.

STERILIZATION

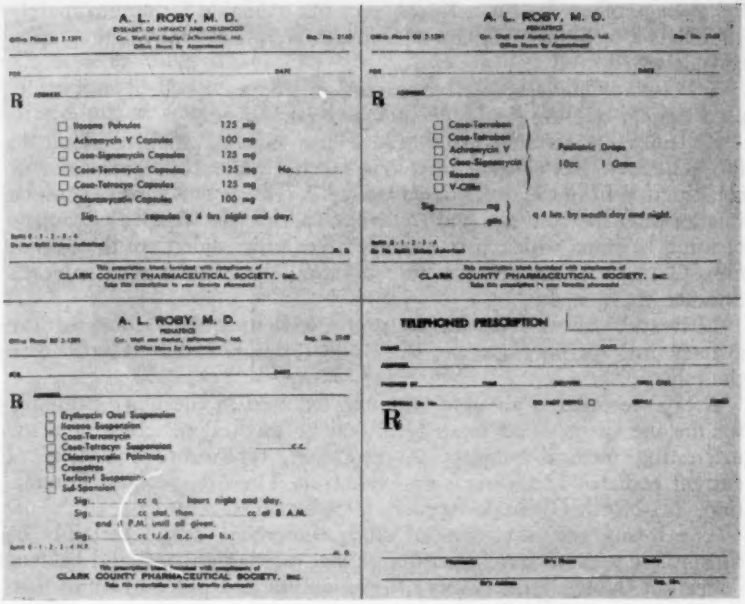
Sterilization of equipment and supplies is done by autoclaving. (See also page 387.) Hepatitis can occur when inadequate methods of sterilization are used, and certain types of bacteria can withstand boiling or chemical sterilization almost indefinitely. For this reason we use dry heat sterilization. The Dri-Clave Company of Franklin Square, Long Island, New York, manufactures an autoclave using the dry heat principle. This compact unit costs approximately 125 dollars.

DRUGS AND SUPPLIES

Drugs and supplies maintained in the physician's office again will be subject to variation depending upon the type of practice and location. In smaller communities where pharmacies are not readily available a more complete supply of emergency equipment and drugs must be kept available in the office. In any case, the office is the base of supply for the physician. The pediatrician's bag can contain certain drugs and materials for emergency treatment, but not all contingencies can be anticipated. The available supply of medicine in the office should be kept to an absolute minimum. Medicine should be prescribed whenever possible and not dispensed. Prescription blanks should not carry the name of any given pharmacy or drug store. The freedom of choice of his favorite pharmacy is as essential as the patient's freedom to choose his physician.

Prescription pads should be available in each treatment room and consultation room and may be previously printed for preparations commonly used. Such pads have been used in my office for several years. They have the advantage of being easily read and quickly filled in for proper ingredients. Previously printed pads are not only time saving, but also tend to eliminate the possibility of mistakes or misinterpretation of the prescription by the druggist. Previously prepared prescription pads for antibiotic drops and suspensions, sulfonamides, cough preparations, nose drops and expectorants are the ones most commonly used (Fig. 54, A).

Another type of prescription pad that has been found useful is the



A B

Fig. 54. Prescription blanks previously printed.

so-called telephone prescription (Fig. 54, *B*). They are kept handy, and when a telephone prescription is called, a copy of the prescription is made out on this blank. At the end of the day these prescriptions are filed separately, eliminating the necessity of making a notation on each chart, although they may be put in the charts later if desired.

DRUGS AND BIOLOGICALS

Probably the most commonly used preparation in the office today is penicillin. It must be kept on hand in various forms, in the multiple-dose vial or disposable Tubex (Wyeth). A recent preparation, Pyralgin (Savage Laboratories, Houston, Texas), a rapid-acting injectible analgesic and antipyretic drug, is a great convenience. The refrigerator must be kept stocked with an assortment of biologicals and immunizing agents. Some drugs which may be needed in emergencies are listed under the discussion of the emergency room.

MISCELLANEOUS EQUIPMENT

Photography has become an increasingly important part of medicine in recent years. With the simplification of equipment, even the most inexperienced photographer can now obtain good photographs in color and in black and white. Several inexpensive pieces of equipment can now be obtained which will fulfill all the needs and requirements in

the average office. Eastman Kodak now has available for approximately 60 dollars a technical close-up outfit which simplifies office photography considerably.

A Polaroid Land camera with accessories is an excellent and easily used camera offering many advantages in the office.

Rolleiflex has recently introduced a new camera which is simple to use. The new Rolleiflex 4 by 4 has taken all the basic principles of construction from the well known Rolleiflex 6 by 6. This camera is much smaller than the conventional Rolleiflex and has the decided advantage of using 127 film, which gives a much larger super slide than the 35-mm film. Close-up lenses are available bringing the camera to a subject's distance to 12 inches.

There are many other cameras of excellent quality, but for the average amateur photographer these will certainly fulfill every need in the office.

A tape recorder is an item that may be used in the office primarily for the use of prepared tapes furnished by medical societies on many interesting medical subjects. Audio-Digest, tape-recorded reviews of current pediatric literature, is available from The Audio-Digest Foundation, 205 North Glendale Avenue, Glendale 6, California.

The listing and discussion of office equipment would certainly be incomplete without some mention of that most often used and beloved coffee pot. Nothing offers more to tranquility and peace of mind than the five-minute coffee break.

THE PHYSICIAN'S BAG

The physician's bag and its contents will again vary considerably from physician to physician and from location to location. The compartmented physician's bag seems to be a general favorite, since it is organized in providing a place for everything in individual compartments. The contents should include the following:

Stethoscope
Otoscope-ophthalmoscope combination
Tongue blades
Cotton applicators
Cotton
Alcohol
Cerumen curet
Metal applicator
Reflex hammer
Finger cots
Thermometers, rectal and oral
Sterile syringes
Individual B-D Steritubes
Procaine penicillin
B-D-Disposable Sterile Syringes
Chloromycetin succinate for injection
Aqueous epinephrine in ampules
Sus-Phrine, 5-cc. vial
Demerol, 100-mg. ampule
Decadron, injectible, 4 mg. per cc.
Solu-Cortef Mix-O-Vial, 100 mg.
Aspirin
Codeine tablets, ¼ grain
Benadryl, injectible
Dramamine, injectible
Nalline, 2-cc. ampule
Emergency medications to include a small supply of various antibiotics, bandages, tapes, surgical dressings, antiseptics, butterfly Band-Aids

SUMMARY

First impressions are usually the most lasting. For this reason the waiting room should present an attractive, cheerful appearance. Furni-

ture throughout the office should be practical, useful and indestructible. Careful planning will lead to much more efficient utilization of available space. A separate waiting room and examining room for teenager and adolescent are desirable if at all possible. The office remains the base of operation and supply and should reflect this in adequate but not surplus supplies and equipment. Eighty-five per cent of all diseases and emergencies seen can be adequately diagnosed and treated in the properly equipped office.

REFERENCE

1. Nilsson, D. C. and Sisson, J. C.: Serious Reactions to Penicillin. *Postgrad. Med.*, 27:4, 1960.

201 E. Market St.
Jeffersonville, Ind.

STERILIZATION AND STORAGE OF SYRINGES, DRESSINGS AND INSTRUMENTS

ELLIOTT PODOLL, M.D.

In the past few years there have been many innovations in the sterilization of syringes and instruments. Autoclaves have been designed especially for the office, and many more prepackaged sterilized instruments, syringes and other materials are available. The physician no longer has to resort to the old-fashioned water-bath type of sterilizers for his syringes. No longer does he have to worry about dipping into the sterilizer each time he needs a clean syringe. In the following paragraphs I will describe new methods.

THE AUTOCLAVE

The autoclave has become an essential part of the physician's office. With the numerous injections using many different types of materials, the autoclave is just about the safest method for sterilization of syringes. Several small models of autoclaves have been developed. They are not only automatic, but they also have many safety features that are essential for the small laboratory or office. The Castle Company has put out a small stainless steel autoclave that heats to a spore-killing sterilization temperature in about seven to eight minutes. It functions at a pressure of 15 to 20 pounds and automatically turns off at the end of a sterilization period. The dials which indicate the temperature and pressure are easily read, and there are safety lights which indicate whether the autoclave is heating or cooling.

This autoclave holds two instrument trays that are perforated to allow steam to permeate the entire area. If these trays are removed, they can be replaced by steel boxes. These steel boxes have containers for about twenty 2-cc. syringes and an equal number of various-sized needles. When the box is sealed, it will remain sterile for an indefinite time. Our office sterilizes three of these boxes in a morning's time. This allows us to have sterile syringes during the entire morning hours; during the lunch period the three boxes can be resterilized.

The chamber of the Castle autoclave is also large enough to sterilize gloves and surgical packs for minor surgery.

The physician will find it a saving if he buys unsterile gauze, and packages and sterilizes it in the sterilizer.

SYRINGES

Packaging of syringes in paper sacks to be sterilized is an efficient way of always having dry sterile syringes for drawing blood and other laboratory procedures. We try to resterilize these syringes at least once a week. It is practical to package the syringe and the needle in a separate unit. Some offices will include three different-sized needles with a syringe. This is a waste of needles; also if the package has to be resterilized many times, the needles become dull.

Disposable syringes with needles already attached are becoming a popular way of carrying syringes for home calls. These disposable syringes have been improved greatly over the past few years. The barrel of the syringe is now glass, and there is little danger of breakage or leakage around the barrel. The cost of the disposable syringe is justifiable for the home call, but not for use in the office except in emergencies.

PACKS FOR MINOR SURGERY

Some physicians are called upon to perform minor surgery, such as suturing small lacerations. Equipment for this procedure should always be available. Our office keeps about four sterile packs made up at all times. These each include a drape. The drape is a doubled kitchen towel purchased at any dime store in packages of six for a dollar. We purposely do not make a hole in the drape until we do the operative procedure. The drape is folded in four parts so that by cutting the closed corner of the drape we can vary the size of the opening according to our needs. Our sterile packs are wrapped in good heavy meat market paper and tied with rubber bands. We find that the rubber bands will take autoclaving several times without breaking. The paper is folded in a "drugstore fold" which is practically leak-proof.

MISCELLANEOUS STERILIZING SUPPLIES

Prepackaged Vaseline gauze is probably the best type of dressing to keep for burns. Wrapped tongue blades can easily be sterilized and will be useful in spreading medications.

A separate sterilizing container for knives used to open boils and other badly contaminated wounds should be kept separate from any instruments used for clean surgical procedures.

3333 Bardstown Rd.
Louisville 18, Ky.

RECORDS AND FORMS

ELLIOTT PODOLL, M.D.

Records maintained for the care of children are probably used more than those for any other person. From birth through childhood, visits to the doctor are usually regular and form a chart of progress in a chronologic order. These records must not only record the growth and development, but also give a precise picture of immunizations, diseases, accidents, allergies, and so on. The data must be in a form that lends itself to rapid assessment in case of any emergency. Many times a physician is called upon when a child is injured or exposed to a contagious disease and must be able to make decisions as to booster immunizations quickly.

Records are a personal part of a medical practice. A physician's habits are reflected by the type of records he keeps. It is amazing how soon a young physician forgets the records he was forced to keep when he was a resident and how he quickly cuts as many corners as possible in his own records when he becomes a private practitioner.

The type of practice that a physician has also determines the type of records he keeps. Those in solo practice do not have to be as precise and orderly in record-keeping as a physician in a partnership or clinic type of practice.

A man in a practice that consists of more consultation type of work must record a more detailed history and thereby have a different record form than the general type of practice. For example, in the general type of practice the physician will probably concentrate on an orderly front sheet that contains immunizations, weights and infectious diseases. He will also need a greater space to record individual visits and a method for charting home visits.

The size of the charts may vary from a 4 by 6 card to an 8½ by 11 letter-size sheet that will fit in a Manila folder. We found that an 8 by 10 chart which can be folded to fit in a 5 by 8 folder takes less room, yet is just about as large as the letter-size chart.

There are many commercial houses that make up these charts, but the average physician can probably make up his own chart and be more satisfied with its layout.

CLINICAL RECORDS

Family History

Family records in a pediatrician's office are not only important from a financial standpoint, but also have a significant value for assessing home life. Many times a behavior problem can be traced to both parents working or a father who is never at home. Allergies, diabetes and mental disturbances are important to the history. These pertinent facts can be brought out without embarrassment if the parent is allowed

DATE_____

PATIENT INFORMATION MEMO

CHILD'S NAME | BIRTH DATE | SEX

ADDRESS_____

CITY_____ ST_____

PHONE_____

FATHER'S NAME_____ OCCUPATION_____

EMPLOYER_____ PHONE_____

MOTHER'S MAIDEN NAME_____

EMPLOYER_____ PHONE_____

MEDICAL INS. YES ☐ NO ☐ SURGICAL YES ☐ NO ☐

MEDICAL INS. GROUP NO._____ CERT. NO._____

COMPANY_____

REFERRED TO US BY_____

ADDRESS_____

Fig. 55.

to fill out a history form before examination. With a new patient we have the father or mother fill out a patient information memo (Fig. 55). Other practical information would be the name of the family druggist and the manner in which the patient was referred. This information is gathered on a work-sheet type of information pad and is later typed on a permanent record in the form of a ledger sheet.

For each family there should be a separate family history sheet giving any relevant information: history of convulsions, allergies, food idiosyncrasies in the parents and history of chronic diseases such as diabetes, tuberculosis, and so on.

Our office keeps a separate chart for each child. We find it useful, however, to place the names of any other siblings on every chart. Obviously, as one's practice grows there are duplications in children's names. By including other brothers and sisters the confusion of getting the wrong chart can be eliminated.

Patient's Chart

Our office uses a chart divided into two parts (Fig. 56). The front page has space for a complete history and physical examination. We try to fill this page in as completely as possible on the first visit. On the back page are ruled lines for follow-up visits. If this chart is used properly, anyone in the office can quickly determine any immunization necessary or be able to tell the date of any childhood disease. In other

Name

Address Father's name

Change Telephone

Age Sex Birth Date Birth Wt.

	1st	2nd	3rd	Booster	Booster	Reaction
DPT						
DT						
Tetanus						
Salk						
Vaccination						

Drug Allergy

Measles Chicken Pox

German Measles Mumps

Roseola Whooping Cough

Scarlet Fever Other Diseases

TB Test History Other

Head up Walked Cup

Rolled over 1st tooth Toilet trained

Sat up Words Sentence

PRESENT HISTORY

Physical Findings Temp. Ht. Wt.

Fig. 56.

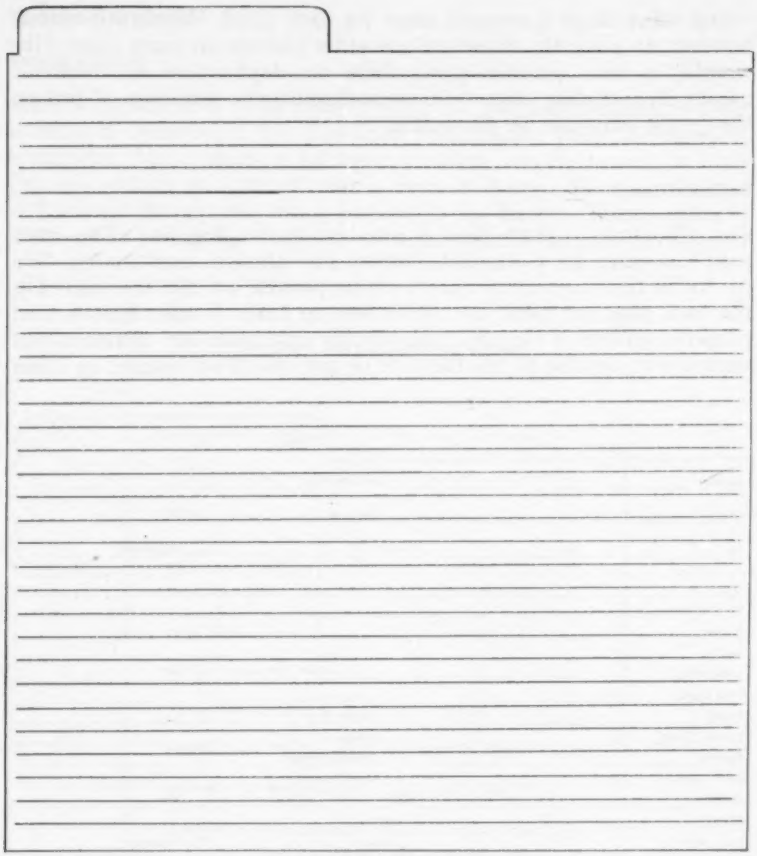


Fig. 56 (*continued*).

words, the front of the chart is a quick appraisal of the child's history and a complete detailed history and physical examination for the first visit.

We have tried to make one chart fit all ages, but as our practice grows we see that a pediatrician actually needs three charts: one for the child he follows from the newborn period, another for older children, and still another for adolescent children.

Laboratory Records

The method for recording laboratory procedure depends on the amount of laboratory procedure that a physician does. The practice of having a separate laboratory card for the chart or a specified location on the chart is probably a better way to locate laboratory work. Laboratory

procedures can lose their significance rapidly if they are not properly recorded and dated.

BUSINESS FORMS

During the first year of life monthly visits are fairly easy to establish. Immunization, diets and advice on a monthly basis are accepted by the parents. This promptness may even carry over into the second year.

After the second year the routine visit is replaced by the "when necessary" attitude. This is the time immunizations and well-child follow-ups are easily forgotten.

Recall Card

We have found that the majority of patients like some type of reminder. We have used the postal card with great success. Once the office personnel becomes accustomed to writing a follow-up card at the time of a routine visit, the recall card is little trouble.

The postal card is worded:

This is to remind you that _____ will be
child's name

due to receive on _____ _____. Please
date immunization

call for an appointment.

These cards are placed in a file and mailed out one week before the patient is due. Our office force is trained to make out these cards the same day that the patient visits the office for a routine visit. The cards are filed chronologically. Once the office force makes this procedure routine, it is simple to maintain.

Another advantage of the card recall system is the control of appointments. Cards are not sent the week before vacations or out-of-town meetings. The patients ordinarily due in during this time can be spread out so that they will not be too concentrated after the physician's return. Some physicians will say that the recall system is too commercial or that the responsibility for visits should be that of the parent. We tried to discontinue our card system during one period of our practice, but there was such a storm of disapproval that we had to reinstate it quickly.

Other methods for recall have been tried by colleagues. Some hand the patient an appointment card for the next visit. Here, of course, there is a great possibility of losing the card or forgetting to record the appointment. We find that when the patient receives the card one week before the time she is to come into the office, she will usually call us immediately to make the appointment.

The telephone recall system has not proved satisfactory. The time consumed and the frustrations of a busy line, and so on, are just too much effort.

ELLIOTT PODOLL, M.D.
JOSEPH W. FOWLER, M.D. GL 8-2667

HEALTH RECORD
of

_____

Date		
_____	1st month	Exam.
_____	2nd month	Exam. Quadruple Vacc.
_____	3rd month	Exam. Quadruple Vacc.
_____	4th month	Exam. Quadruple Vacc.
_____	5th month	Exam. Hbg
_____	6th month	Exam. Small Pox
_____	7th month	Exam. Mantoux
_____	8th month	Exam. Histo.
_____	9th month	Exam. DPT Booster
_____	1 year	Exam. Salk Vacc.
_____	15th month	Exam.
_____	18th month	Exam. DPT Booster
_____	21st month	Exam. Hbg
_____	2 years	Exam. Salk Typh. Series
_____	2½ years	Exam. Mantoux
_____	3 years	Exam. DPT Booster Salk Hbg RBC
_____	3½ years	Exam. Urinalysis Mantoux
_____	4 years	Exam. Salk Hbg RBC
_____	4½ years	Exam. Urinalysis
_____	5 years	Exam. Salk DPT Hbg & RBC Urinalysis

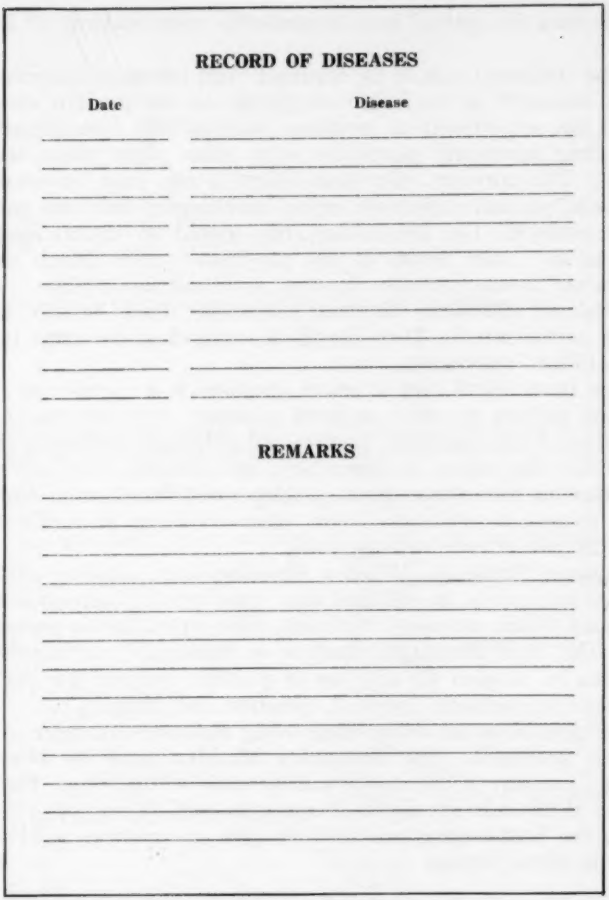
Thereafter each child should have a complete examination, blood count, urinalysis and Salk vaccination each year. DT booster every two years.

Fig. 57.

We have found that it is much better to address the recall card to the patient himself when he is over seven and can read. The child will take a greater interest in the visit to the physician's office when the postal is addressed to him.

Forms for the Patient

At least for the first five years of life, parents would like to know what to expect in the way of visits to the physician (Fig. 57). We keep a duplicate of this card in the file in case the mother loses her copy.



RECORD OF DISEASES

Date | Disease

REMARKS

Fig. 57 (*continued*).

Vaccination Procedure

We have found that it is much easier to give the parent a day-by-day description of what to expect after a smallpox vaccination has been given the child. This form also tells about the care of the vaccination site and what can be done for febrile reactions to immunizations. The simplified directions save us many calls.

Statements

The medical profession has neglected to educate new physicians in the business procedure of medicine. The young physician is left to his own devices unless he seeks a medical management company.

There are a few general rules to remember when making out a statement.

1. The statement should be itemized. The statement reading "For services rendered" is no longer acceptable in our modern economy. Patients are accustomed to receiving itemized bills from department stores, drug stores and practically every other place where they do business. The criticism that itemization is too time consuming is not a valid one any more with newer bookkeeping machines and procedures available. The itemization code should be just as simple to record as any other record in the physician's office. Much time is saved in not having patients telephone in to ask about bills.

2. Send out statements on time. Statements should be sent on the last day of the month. They should be received at the same time as other creditors' statements.

3. We have found that a return envelope is a useful way of encouraging patients to remit payment promptly. It is not necessary to stamp these return envelopes. Just the self-addressed envelope is enough to stimulate the patient to return his check promptly. We have found it practical to have these return envelopes a different color from our regular statement envelopes. These return envelopes are easily picked out of the pile of mail received daily.

4. Business Machines. When a physician starts sending out more than 500 statements, he will find that some type of business machine is practical. There are many machines made especially for professional offices. The small Burroughs machine or National Cash Register machine can be adapted for any size of practice and will pay for itself in a short time with its speed of operation and accuracy.

Many physicians are using duplicating machines in order to send out their statements. The Thermofax Machine made by Minnesota Mining Company is the most widely used of this type. The only criticism of this machine is that it copies too well. It can copy mistakes, whereas the bookkeeping machine can pick up mistakes quickly if it is fed the correct figures.

There are many other business forms that could be mentioned. Insurance release forms, types of receipts, and acknowledgment forms to send to other physicians are important.

SUMMARY

The practicing physician must maintain a number of records. In general these are of two types, although their function may sometimes overlap. Some of these records have to do purely with the clinical side of practice, while others are more of a business nature. Such records have been discussed and some specific examples cited.

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Louisville 18, Ky.

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